2021-06

A MEMES ROLE IN INFORMATION DISORDER CAMPAIGNS: DESIGNING AN EXPERIMENT THAT DRAWS CORRELATIONS BETWEEN AGE, EDUCATION LEVEL AND GENDER, AND PARTICIPANT WILLINGNESS TO INTERACT WITH FALSE INFORMATION

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THESIS

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June 2021

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REPORT DOCUMENTATION PAGE			*Form Approved OMB No. 0704-0188*

1. AGENCY USE ONLY *(Leave blank)*	**2. REPORT DATE** June 2021	**3. REPORT TYPE AND DATES COVERED** Master's thesis

4. TITLE AND SUBTITLE A MEME'S ROLE IN INFORMATION DISORDER CAMPAIGNS: DESIGNING AN EXPERIMENT THAT DRAWS CORRELATIONS BETWEEN AGE, EDUCATION LEVEL AND GENDER, AND PARTICIPANT WILLINGNESS TO INTERACT WITH FALSE INFORMATION	**5. FUNDING NUMBERS**
6. AUTHOR(S) Katherine A. Cisewski	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000	**8. PERFORMING ORGANIZATION REPORT NUMBER**
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) N/A	**10. SPONSORING / MONITORING AGENCY REPORT NUMBER**

11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release. Distribution is unlimited.	**12b. DISTRIBUTION CODE** A

13. ABSTRACT (maximum 200 words)

The use of social media has been growing every year since its inception. With that, individuals, organizations, businesses, and nations have created clever ways to spread messages to large audiences; however, in the last decade, those same entities have begun utilizing social media to spread false narratives that fit their agenda. Using Tweets and memes, non-state and state actors have successfully influenced elections, incited riots, and increased membership. Current academic research does not describe who is most susceptible to this new type of information disorder. For that reason, the experiment detailed in this thesis was designed to aid information environment researchers in identifying groups that are most susceptible to information disorder; when conducted, it will reveal correlations between the acceptance and propagation of false information spread through Tweets and memes and the age group, gender, and education level of those most likely to interact with the false information. Once complete, defensive and offensive measures can be put in place by individuals, organizations, businesses, and nations to defend or attack the most at-risk groups.

14. SUBJECT TERMS human-machine interaction, information warfare, information sciences	**15. NUMBER OF PAGES** 109
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	**18. SECURITY CLASSIFICATION OF THIS PAGE**	**19. SECURITY CLASSIFICATION OF ABSTRACT**	**20. LIMITATION OF ABSTRACT**
Unclassified	Unclassified	Unclassified	UU

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. 239-18

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Submitted in partial fulfillment of the
requirements for the degrees of

MASTER OF SCIENCE IN INFORMATION TECHNOLOGY MANAGEMENT

and

MASTER OF BUSINESS ADMINISTRATION

from the

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ABSTRACT

The use of social media has been growing every year since its inception. With that, individuals, organizations, businesses, and nations have created clever ways to spread messages to large audiences; however, in the last decade, those same entities have begun utilizing social media to spread false narratives that fit their agenda. Using Tweets and memes, non-state and state actors have successfully influenced elections, incited riots, and increased membership. Current academic research does not describe who is most susceptible to this new type of information disorder. For that reason, the experiment detailed in this thesis was designed to aid information environment researchers in identifying groups that are most susceptible to information disorder; when conducted, it will reveal correlations between the acceptance and propagation of false information spread through Tweets and memes and the age group, gender, and education level of those most likely to interact with the false information. Once complete, defensive and offensive measures can be put in place by individuals, organizations, businesses, and nations to defend or attack the most at-risk groups.

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ACKNOWLEDGMENTS

Throughout the writing process, Dr. Canan was committed to helping me succeed, despite my tendency toward procrastination. Thank you for believing in a thesis all about memes, Mustafa! Without you, these pages would not exist.

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I. INTRODUCTION

A. SOCIAL MEDIA, THE NEWS, AND MARKETING: WHAT COULD GO WRONG?

According to a 2019 study by the Pew Research Center, 55% of U.S. adults get their news from social media (Suciu, 2019). This figure is up 8% since 2018 and has likely increased more due to the 2020 global pandemic (Suciu, 2019). Currently, Facebook accounts for 52% of said news, while Twitter is at 17% and Instagram is 14% (Suciu, 2019). In addition to news, many social media users are seeking product discovery (Gorman, 2021). According to Global Web Index, a leading marketing firm for targeted advertisements, 42% of individuals use social media for brand/merchandise research and roughly "24% of global internet users have clicked on a sponsored post or ad on social media" during any given month (Gorman, 2021, sec. "Who clicks on social media ads?"). Although many people assume that articles are the main source of news, and digital marketing advertisements for product sales, short text blurbs, like Tweets (Figure 1), and quick scroll images, like image macro memes (Figure 2), are becoming a mainstream and rapid source for current events and brand awareness (Boulter & Bolaji, 2020; Mottola, 2020). Occasionally, the worlds of social media advertising and news will collide, utilizing algorithms (discussed in Chapter II) to target certain audiences for bipartisan or social justice topics (Weise, 2018). Unfortunately, this type of intersection creates a massive vulnerability to American citizens, opening them up to influence campaigns run by external groups.

While social media does a great job of disseminating word rapidly and to a number of audiences, this form of mass distribution opens doors for a new type of information operation. Russia, a nation on the forefront of this movement, has been infiltrating social media for many years (Wardle & Derakhshan, 2017). Notably, as described in a Senate Intelligence Committee report, the 2016 election was fraught with memes and Twitter accounts propagating false information aimed at dividing our nation (2019). Much of this misinformation took the form of targeted advertisements, like the one beginning with "African-Americans have to choose between old Hillary Clinton and rich Donald Trump,"

that was directly displayed to Facebook users identifying as Hispanic, Asian American, or African-American (Weise, 2018, para. 8). Furthermore, after seemingly failed influence attempts, China agreed to work with Russia in current and future information operations against the Western nations, who they claim to have distorted the narrative around the current global pandemic (Weitz, 2020). With that in mind, it is safe to say that foreign actors have successfully attempted to influence the thoughts and actions of American citizens, and they will only improve at it. These tools (i.e., Tweets, memes, and targeted advertisements) are assisting our peer-adversaries in completing their mission, making it vitally important that we understand who is most susceptible to online delivered information weapons.

B. KEY INFORMATION DISSEMINATION TOOLS: TWEETS AND IMAGE MACRO MEMES

Using no more than 280 characters at a time, Twitter (2021a), an online social media platform, allows users to instantly express their thoughts and feelings to the world at large, describing themselves as serving public conversations. The organization believes "you should be able to speak your mind and find credible information easily" (Twitter, 2021c, sec. "Healthy conversations"). The Twittersphere is not exclusive to individual users; companies and organizations may use the platform to promote new products, share news articles, or show support for current change initiatives. Figure 1, containing a real Tweet from *The New York Times* Twitter page, is annotated to pinpoint specific aspects of Tweets that, as detailed in a later chapter, were altered during creation of the false Tweets in the experimental design of this thesis.

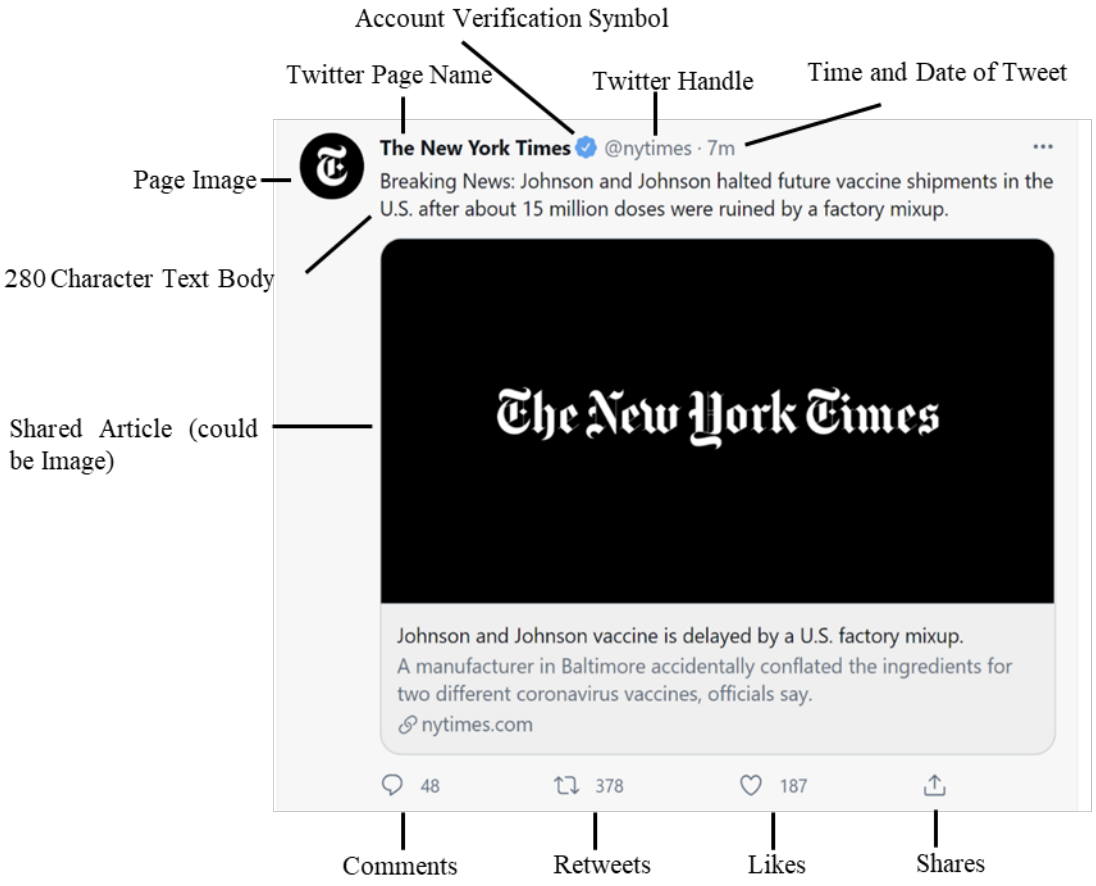

Figure 1. A breakdown of a Tweet. Adapted from Twitter (2021).

Image macro memes, like Figure 2, are likely what comes to mind when the word "meme" is used in conversation or writing; they contain text on top of a widely distributed photograph (Mina, 2019). For that reason, image macro memes are what will be used for this experimental design. However, these digital objects consist of more than images with text, encompassing videos, performances, and selfies as well (Mina, 2019). Image macro memes appear on all social media platforms, including Twitter, Facebook, Instagram, Tik Tok, Reddit, etc., and may be shared by any user in a matter of seconds.

Figure 2. Image macro meme

C. WHAT MAKES MEMETIC RESEARCH IMPORTANT?

Whether a social media user is on Twitter, Facebook, Instagram, or another popular application, they are bound to see memes daily. These memes, even if the viewer does not realize it, are being created with specific goals in mind; through humor and irony (Burroughs, 2020), memes serve as marketing strategies, evident by Fashion Nova's Instagram takeover (Raaf, 2018), political campaign ads and propaganda (Burroughs, 2020), extremist recruitment (Zitser, 2021), or foreign influence tools (Wardle & Derakhshan, 2017). Because this information dissemination tactic has evolved from simple humorous and ironic images into manipulation techniques, it is paramount that society gain a better understanding of how they propagate.

With undeniable benefits to marketing on social media, it is not surprising that 96% of small businesses use it for their marketing strategy (Shepherd, 2021). In fact, social media marketing use drives an increase in customer loyalty, leading consumers to spend

40% more money once engaged with the business via a follow, like share, etc. (Shepherd, 2021). Because the preponderance of social media users are on the applications to laugh, memes as a marketing tool are growing in popularity (Sprout Social, 2018). Brands ranging from Slim Jim to BarkBox are currently utilizing image macro memes (Barker, 2021) like the ones displayed in Figure 3. Slim Jim, whose official Instagram page is covered in image macro memes, has amassed a following of 1.3 million people (slimjim, 2021). With such a large following, Slim Jim holds a lot of influence; if they chose to start posting politically driven memetics vice meat stick centric ones, there is no telling what impact they would have. Luckily, however, most companies leave the controversial memes to individual users, extremist groups, or foreign state actors, who may or may not have a following near that of Slim Jim.

Figure 3. Slim Jim and BarkBox image macro memes. Source: Slimjim (2021) and BarkBox (2021).

According to the *Washington Post*, the 2016 political primaries were "the most-memed election in U.S. history" (Heiskanen, 2017, p. 1). However, one can make a case that the 2020 election took the crown; upon a quick Google search, millions of articles appear characterizing an abundance of memes from the most recent presidential election.

For example, *Inside Hook* published a piece entitled "Election Week 2020, As Told in Memes," while *Cosmopolitan* wrote "These 2020 U.S. Presidential Election Memes Will Keep You Laughing Until Inauguration Day" (Isaac, 2020; Mahan, 2020). Prior to the 2020 election, copious amounts of politically driven memetics tended to point out candidate hypocrisy or critique policy positions (Heiskanen, 2017). Due to the lack of literature surrounding the most recent election, it is difficult to say whether the 2020 memes were focused on the same central points. However, upon review of the two articles mentioned above, the 2020 election may have encompassed a wider breadth of topics, like the removal of Donald Trump from office (Isaac, 2020). Interestingly, politically driven memes like the ones mentioned propagate quicker within groups of the same political ideology, making it difficult to tell whether they influence voter action (Heiskanen, 2017). Despite the uncertainty behind the influential factor of memetics, many extremist groups and foreign actors still use them to gain group members or push narratives that benefit them (Graff, 2018).

According to the CEO of the Center for Countering Digital Hate (CCDH), a not-for-profit organization aimed at "disrupting the architecture of online hate and misinformation" (CCDH, 2021, sec. "About"), "Instagram is actively pulling its predominantly young users down an extremist rabbit hole" (Zitser, 2021, para. 5). At the forefront of these extremist groups is the neo-Nazis (Zitser, 2021). HOPE Not Hate, a United Kingdom based group focused on defeating extremism (HOPE not hate, 2021), names Instagram as the "platform of choice" for radicalizing the young generation into neo-Nazi supporters (Zitser, 2021, para. 7). According to a researcher at HOPE Not Hate, memes are the easiest way to spread these ideologies, allowing propagators to hide extremism under humor and irony (Zitser, 2021). Once a user interacts with extremist posts on Instagram, the algorithm pushes like-information to the "explore" page on the users individual account, only increasing the content they encounter (Warren, 2021). According to the social media site itself, "interest" is the number one driving factor for feed posts, pushing items believed to be "liked" by the user to the top of their screen (Warren, 2021). This means that, while one individual may see cookie decorating and cake baking, another user will view neo-Nazi and racially charged hate.

If extremist groups are using memetics to boost membership, it should come as no surprise that foreign actors, specifically Russia and China, are using them to spread propaganda and pit our nation against itself (Gaff, 2018; Kao & Li, 2020). In fact, an attempt at destabilization through predominantly politically driven misinformation memetics has become commonplace (Weitz, 2020). Things like political candidates, second amendment rights, and even the COVID-19 pandemic are drivers for foreign influence operations (Weitz, 2020; Wyrich, 2017). For example, in Hong Kong, a number of students rapidly spread COVID-19 memes with hashtags that placed blame on China and its people, hoping to continue longstanding anti-Chinese movements in the area (McMinn, 2020). As discussed, however, the effectiveness of memes at dividing a nation is unknown (Heiskanen, 2021); this thesis and experimental design will address this gap in the literature.

D. PROBLEM STATEMENT

Memes have taken center stage in discussions about marketing, politics, extremist recruitment, foreign state actors, and even the COVID-19 pandemic (Burroughs, 2020). The memes, which include a combination of perceptual cues/elements (Figure 2), traditionally manifest themselves as images, texts, videos, performative pieces, and selfies (Mina, 2019). However, despite their immense popularity in social media and online environments, the field remains understudied. This omnipresence of memetics gives rise to an important question: How do memes affect the acceptance and propagation of false information? If it is determined that including memes in perceptual stimuli can give rise to systemic variation by age, gender, and education level when propagating false information, they can be used as leverage in all the methods listed above, especially influence operation targeting endeavors.

E. PURPOSE STATEMENT

The purpose of this thesis is to design an experiment that explores how memes affect the acceptance and propagation of the false information within various ages, education levels, and gender groups, when compared to text blurbs (Tweets) alone. In order to achieve that, an experiment was designed through the Naval Postgraduate School via the

online experimental platform Qualitrics, which, when performed, may be delivered via Mechanical Turk (MTURK). The independent variables are the age, education level, and gender, which are provided by the experiment participants. The dependent variable is the participant willingness to interact with the presented Tweets and memes and their reason for doing so. The manipulated variable is the presentation of Tweets and image macro memes that contain false information.

F. RESEARCH DESIGN

After completing an in-depth literature review, this thesis utilizes experimental design to address the purpose and problem statements. It expounds upon how the experiment was built, including the reasoning for every single Tweet and meme contained. Following methods, the implications for completing the experiment and recommendations for future work are detailed. The overarching experimental design for this thesis focuses on answering the below hypotheses through an analysis of various participant response to a series of Tweets and image macro memes riddled with false information. The survey created helps researchers examine whether age, education level, and/or gender correlates to the acceptance and propagation of false information spread through image macro memes, comparing it to the acceptance and propagation of false information spread exclusively through text blurbs. Additionally, as summarized in Chapter III, it will test the effects of initial categorization on survey response. The experiment's null hypothesis is that age, education level, and gender have no influence on the rate of acceptance of false information via memes. This experiment is designed to test the following hypotheses:

- HA1: Age correlates to the acceptance of false information spread through a Tweet and an image macro meme.
- HA2: Education level correlates to the acceptance of false information spread through a Tweet and an image macro meme.
- HA3: Gender correlates to the acceptance of false information spread through a Tweet and an image macro meme.

- HA4: Age correlates to the propagation of false information spread through a Tweet and an image macro meme.
- HA5: Education level correlates to the propagation of false information spread through a Tweet and an image macro meme.
- HA6: Gender correlates to the propagation of false information spread through a Tweet and an image macro meme.
- HA7: Initial categorization has an effect on the acceptance of false information spread through Tweets and image macro memes.
- HA8: Memes will be interacted with (by indication of liking, commenting, or sharing) at a different rate than Tweets.

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II. BACKGROUND

To better understand the interplay of social media and influence, a deep dive into the topics of social media, memetics, information disorder, and initial categorization is necessary. By unraveling intricacies within the aforementioned topics, one will gain a better understanding of the literature review in Chapter III and the thought process behind the experimental design detailed in Chapter IV.

A. THE RISE OF SOCIAL MEDIA

While social networking took root in the 1960s with the invention of ARPANET, most social media sites were not built until the 1990s, lining up with the commercial launch of the internet (Edosomwan et al., 2011). Although many social media platforms came before it, MySpace was the most popular social media site in the United States until 2008, when Facebook took over (Edosomwan et al., 2011). Currently, YouTube, Facebook, and Instagram are the most commonly used platforms, with over 40% of all adults using all three applications (Auxier & Anderson, 2021). Twitter, the seventh most popular site, is being used by 23% of adults (Auxier & Anderson, 2021). Naturally, with such a large number of users, social media comes with pros and cons; while these platforms allow individuals from all over the world to connect and find common ground on various topics, it has been shown to increase depression and anxiety, as well as lower sleep quality and self-esteem in its users (Mammoser, 2018). Depression, anxiety, and low self-esteem tend to occur when users over analyze their lives versus another user's life (Mammoser, 2018). Additionally, it has been determined that covering distressing events via media, whether it be posts online or news casts, is harmful to viewers, sometimes even leading to higher acute stress than being at the distressing event itself (O'Brien et al., 2020). Despite knowing that, social media use has been on a steady rise since its inception (Auxier & Anderson, 2021), forming communities for people, serving as a platform for activism and politics, and helping organizations/companies market products and ideas.

1. Social Media as a Community

With the rise of social media, researchers began looking into Twitter, Facebook, Instagram, and all other platforms for signs of online communities. What they found was, through the social network perspective, many groups on social media meet the requirements to be considered a community (Gruzd & Haythornthwaite, 2013). By identifying the actors, informal and formal ties, roles, and cliques formed on these sites, one can begin to see how seemingly random interactions may grow into full communities (Gruzd & Haythornthwaite, 2013). For example, two million people follow the account "WeRateDogs" on Instagram. On Twitter, nine million people follow the same account, ran by the same individual. Every day, followers will send pictures of their dogs to Max, the account owner, and he posts them for all to see. The hashtags, which may include something like "#seniorpupsaturday" is then used by those in Max's community, which is evident by clicking on said hashtag and reviewing the similar posts (WeRateDogs, 2021c). In addition, Max has created a merchandise line that all followers can immediately recognize; his "tell your dog I said hi" decals and masks easily help identify members of the WeRateDogs community (WeRateDogs, 2021a). Finally, Max regularly posts GoFundMe pages for dogs in need of medical care, which always get fully funded in under thirty minutes (Weratedogs, 2021b). This example highlights the exchange of information, social support, and play that occurs between members of the WeRateDogs community, legitimizing social media as a community through the lens of the social network perspective (Gruzd & Haythornthwaite, 2013).

2. Social Media and Activism

From the inception of social media, people have been using the platforms to spread awareness for social issues (Weise, 2018). In 2020 alone, nearly a quarter of users changed their viewpoints on a social justice topic based on posts reviewed on one of the many platforms (Perrin, 2020); most of those users stated that "Black Lives Matter" (BLM) as the driver for that change (Perrin, 2020). BLM, which began in 2014 after the deaths of Michael Brown and Eric Garner, started as a movement on Twitter (Carney, 2016). Since 2014, BLM has made multiple resurgences, the most recent beginning in 2020 with the

death of George Floyd (McLaughlin, 2020). After the video of George Floyd's death circulated rapidly via social media, more than 20 million people began protesting throughout the United States (McLaughlin, 2020). Despite a worldwide pandemic, this social justice issue, which began and spread via social media, was able to move millions to action, truly highlighting the power of these platforms. Nikita Carney, a researcher with the University of California, Santa Barbara and Louisiana State University, believes this occurs because social media has increased the accessibility to information that previously prevented citizens without access to information from having opinions (2016). While BLM is not the only social issue that has been elevated to grand heights by social media, it is the most influential one to occur in the last year.

3. Social Media and Political Appointees

United States political candidates and elected officials rely heavily on social media to reach a broader public. As of April 2021, the official White House Instagram (@whitehouse) account has over six-million followers, and President Joe Biden (@joebiden) and Vice President Kamala Harris (@kamalaharris) have a combined total of over 32 million followers. On Twitter, the two leaders have just under that same mark (2021). While the use of social media platforms started with former President Barack Obama, his successor, Donald Trump, was the one to employ it nearly every few hours for four years, setting a new precedent (Wharton Business Daily, 2020). Through research efforts, it has been shown that appointed officials actually get large increases in support when they utilize this new communication tool (Wharton Business Daily, 2020). This support increase is hypothesized to occur due to the feeling of accessibility that it brings to constituents (Wharton Business Daily, 2020). Additionally, the utilization of social media by political newcomers may help reduce the barrier to entry into political circles, giving hopefuls a voice and platform without the large funding requirements in the past (Wharton Business Daily, 2020).

4. Social Media and Marketing

Social media marketing may have started as emplaced advertisements, but it now encompasses that and much more; influencers, who are social media users with followings

large enough to shape attitudes, partner with brands to bring awareness to products and lifestyle trends (Glucksman, 2017). Through tracking software that monitors engagement with a sponsored post, influencers are able to make money from their partners (Glucksman, 2017). According to experts, for a sponsored post, Instagram influencers should receive $1,000 per 100,000 followers, which allows these individuals/accounts to make a living doing this type of marketing (Mathew, 2018). However, not only is influencer marketing good for the influencer, but 89% of marketers have seen equal or improved return on investment when compared to other marketing techniques (MediaKix, 2019).

Who are these influencers then? Well, some of the most successful ones are seemingly normal accounts that rise to influencer level, not pop culture celebrities (Jin et al., 2019). This is because, as research has shown, people who are perceived to be "normal" or "one of us" are viewed as more sociable and trustworthy to social media users, making them better candidates for marketing partnerships (Jin et al., 2019). While the obvious influencer is the popular person, like Alicia McCarvell who has over 300,000 followers (aliciamccarvell, 2021), other influencers include accounts like @sarcasm_only or @betches, who keep themselves relatively anonymous and post predominantly comedy and meme driven media to their multi-million user followings (2021).

B. WHAT MAKES A MEME, A MEME?

In 1978, Richard Dawkins began using the word "meme" to describe cultural actions that disseminate like genetic material (Mina, 2019). The term has since been coined as the internet phenomenon that describes digital objects sharing the common characteristics of transformation, awareness, imitation, and circulation (Mina, 2019). Those digital objects can take the form of images, texts, videos, performative pieces, and selfies (Mina, 2019). While all listed instances are covered under the formal definition of meme, the image is the most recognizable and the selected independent variable for this study. The image is broken down into two forms: image meme and image macro (Mina, 2019). When an image meme includes text, it becomes an image macro, as shown in Figure 2 (Mina, 2019). Because any individual can create a meme whenever they desire (through websites like imgflip.com), it is very difficult to get an accurate number of their existence

online; however, over two years ago, researchers at University College London were able to easily collect 100,700,000 image macro memes for analysis (Cole, 2018). While readers can reflect on that number and hypothesize how many memes exist today, one can assume that the market is saturated.

Although memes are short units of information, they generally convey a specific narrative (Saint Laurent et al., 2021). These narratives, while predominately humorous or ironic, require that the viewer have an established knowledge base in the topic presented (Saint Laurent et al., 2021). While these digital artifacts do not present a plot like those of traditional stories, they do formulate with a beginning, middle, and ending in mind (Saint Laurent et al., 2021). Additionally, memes tend to reference specific characters, like Kermit sipping tea, helping to bring meaning to a variety of topics based on similar context (Saint Laurent et al., 2021). Despite the lack of a central axis, the character development and crossover, as well as the structured manner in which memes fade in and out of relevancy, equates them to mini stories (Saint Laurent et al., 2021).

While image macro memes can be made and posted to Twitter, Instagram, Reddit, 4Chan, etc., by anyone, they are not guaranteed to be seen by a wide audience (aka go "viral"). According to Lin Wang and Brendan Wood, both researchers at the University of New Brunswick, meme propagation occurs like an infectious virus; through social interaction, meme spread spikes early (infectious stage) but begins to decay once a certain number of people have reviewed the content or it begins to lack relevancy (2011). To prove their claim, Wang and Wood utilized a modified susceptible, infective, and recovered (SIR) compartmental modeling approach, which is commonly used by epidemiologist to compute virus spread (2011). Using the Google Trends tool, the researchers were able to utilize historical search data to graphically depict the spread of popular topics (Wang & Wood, 2011). As hypothesized, Wang and Wood found that search volume spikes sharply within the first days that a newly introduced idea becomes content, then begins to taper off after the allure has run out (2011). Recently, however, this concept of going "viral" is being scrutinized by internet culture enthusiasts.

Abby Ohleheiser, a senior editor for the *MIT Technology Review*, makes a case for abolishing the use of the term "viral," and it is not simply because of the real virus

spreading throughout the world (2020); Abby, through a conversation with Whitney Phillips, a Syracuse university assistant professor, discusses that "viral" should be reserved for popular online digital objects that contain misinformation (2020). Whitney Phillips points out that, because spreading misinformation, whether knowingly or not, causes harm, like a real virus does, the term should be reserved solely for those instances (Ohleheiser, 2020). Additionally, Ohleheiser considers the role that algorithms play in propagating memetics; as she states, "authentic popularity isn't necessarily real: algorithms incentivize content that people are going to engage with, accelerating its spread, and people have gotten really good at manipulating [it]" (2020, sec. "Manipulated popularity").

Social media algorithms, like those mentioned by Abby Ohleheiser, drive what content a user sees by analyzing what kinds of posts they interact with regularly (Etter & Albu, 2021). Traditionally, a user will notice that their content is personalized, displaying memes that center on topics they commonly like, share, and comment on (Etter & Albu, 2021). The coding for these algorithms allows users to become stuck in loops that display only one or two topics, giving rise to organized collectives of like-minded users (Etter &Albu, 2021). As briefly discussed in Chapter I, this continual reemphasis of specific content may expose certain users to constant extremist viewpoints, like Instagram and neo-Nazism (Zitser, 2021).

From its start in 2010, Instagram has amassed over one billion users (Mohsin, 2021). Of those users, 71% are age 34 or younger and spend a daily average of 53 minutes on the application (Mohsin, 2021). While those numbers sound shocking, the age group and usage time do not account for the 2020 global pandemic stay-at-home orders and have likely increased in the last year. When a user first signs up for an Instagram account, they begin following other accounts and posting to their feed. The accounts range from favorite celebrities, clothing brands, activist groups, political ideations, humor, and many more. Commonly, a user will find a form of memetic on every type of account; whether it be the recreation of popular internet dances, ironic image macro memes making fun of the president, or 10 second videos promoting a new product, a user is not likely to use Instagram without seeing a number of memes. Facebook, another top social networking platform, accounts for the preponderance of these types of digital objects. Much like

Instagram, by allowing users to like, share, and comment on things, Facebook enables meme propagation at a very high rate.

What, then, is the algorithm influenced saturated meme market sharing with the world? Well, image macro memes tend to promote products, meld ideologies together, and encourage social activism. Through memetic marketing, like the examples shown in Figure 3 (Slim Jim and BarkBox), companies are able to increase consumer attitudes towards a product, which leads to an increase in purchases (Lee et al., 2019). Co-authors Lee, Liang, Liao, and Chen were able to show this concept by surveying 380 Taiwanese Facebook users about their thoughts towards internet marketing memes (2019). By focusing on both utilitarian attitudes, like functionality representation, and hedonic attitudes, like a representation of fun, the researchers were able to conclude that companies who create memes with hedonic attitudes as the focus can boost online purchases (2019).

Interestingly, memes as marketing strategies are being utilized worldwide, not exclusively in the United States and Asia. In India, a prominent influencer marketing company called Buzzoka has begun meme incorporation (BW Online Bureau, 2020). In fact, their CEO Ashutosh Harbola was quoted saying, "Memes have a definite potential to become a major phenomenon and we as a company are committed to taking the first foot forward" (BW Online Bureau, 2020, para. 4). SBI, after experiencing wide success from a previous meme driven campaign, joined in on a viral Pakistani meme called "Pawri," which was initially circulated by Pakistani influencer Dananeer Mobeen (The International News, 2021). This "Pawri" meme, meaning "party" in Urdu, was then embraced by a multitude of Pakistani and Indian companies, like Netflix India, Zomato, Swiggy, and Oyo Rooms (News18, 2021). The ability for India and Pakistan to find common ground via memetics, despite the possibility of warfare between the two nations (National Intelligence Council, 2021), highlights the online significant influence generated through memetics.

It is important to understand how memetics drive narratives for controversial topics associated with politics and religion. As stitching devices, memes blend multiple internet platforms, narratives and ideologies, and geopolitics together, unifying people based on shared digital media (Burroughs, 2020). These stitched devices then become calcified and weaponized ideology (Burroughs, 2020); this commonly occurs in politics, like what was

seen during the 2016 election season (Figure 4). Too often, memes stitch politics with religion, which is demonstrated rather frequently by conservative individuals or foreign state actors (Burroughs, 2020). Summarily, Benjamin Burroughs, an emerging media researcher for the University of Nevada, explains that "memes have expanded beyond popular culture and humor, they [have] become the grounds for social activism, merging the political and social" ideals (2020, pp. 191-200); this description raises the question that, if memes are now used for social activism, politics, and marketing, what effect do they have on propagating false information online?

Figure 4. 2016 Election meme created and propagated by foreign state actors. Source: *National Post* Staff (2017).

C. WHAT IS INFORMATION DISORDER?

To grasp a better understanding of a particular environment, an individual must gather information (Nissen, 2014); according to Mark Nissen, a professor at the Naval Postgraduate School, one is said to have gathered information when they can glean meaning from a situation (2014). For example, if you were to give the number 120/80 to a

person on the street, they would not know what you wanted them to do with it (Nissen, 2014). Are they dividing 120 by 80? Is it some sort of ratio? After telling the individual that 120/80 is a blood pressure reading, the numbers are transformed from data to information (Nissen, 2014). Depending on the level of knowledge the person has on blood pressure, they can determine what to do with said information (Nissen, 2014). As mentioned previously, memes act as stitching devices, pulling different ideologies and narratives together. Thus, unless a meme viewer can place meaning behind the digital object, the image is simply data, not information. The issue then becomes this: Is the meaning a viewer places on the meme accurate or is the creator attempting to create a false meaning in the viewers mind? If the meaning gleaned from the meme is untrue, the creator has succeeded in employing information disorder.

In 2017, Claire Wardle and Hossein Derakhshan created a new conceptual framework to examine information disorder (Figure 5). This framework breaks down the spread of false information into three categories: misinformation, disinformation, and malinformation and classifies them as "false" and/or "harmful" (cause an adverse effect) (Wardle & Derakhshan, 2017). Misinformation is the spread of false information without the intent of causing an adverse effect, or harm (Wardle & Derakhshan, 2017). Disinformation, on the other hand, is the spread of false information with the intent to cause harm (Wardle & Derakhshan, 2017). Finally, weaponized true information, known as Malinformation. that is spread with the intent to cause an adverse effect, will traditionally appear out of context and frame the information in a way that is no longer truthful (Canan & Akil, 2020; Wardle & Derakhshan, 2017). Commonly, individuals refer to the notion of information disorder as "fake news," which poorly describes the complexities of this domain and encourages a lack of trust in mainstream media (Wardle & Derakhshan, 2017). In an attempt to prevent the undermining of free press, the term information disorder (or one of the three respective types of information), vice fake news, will be used throughout this thesis.

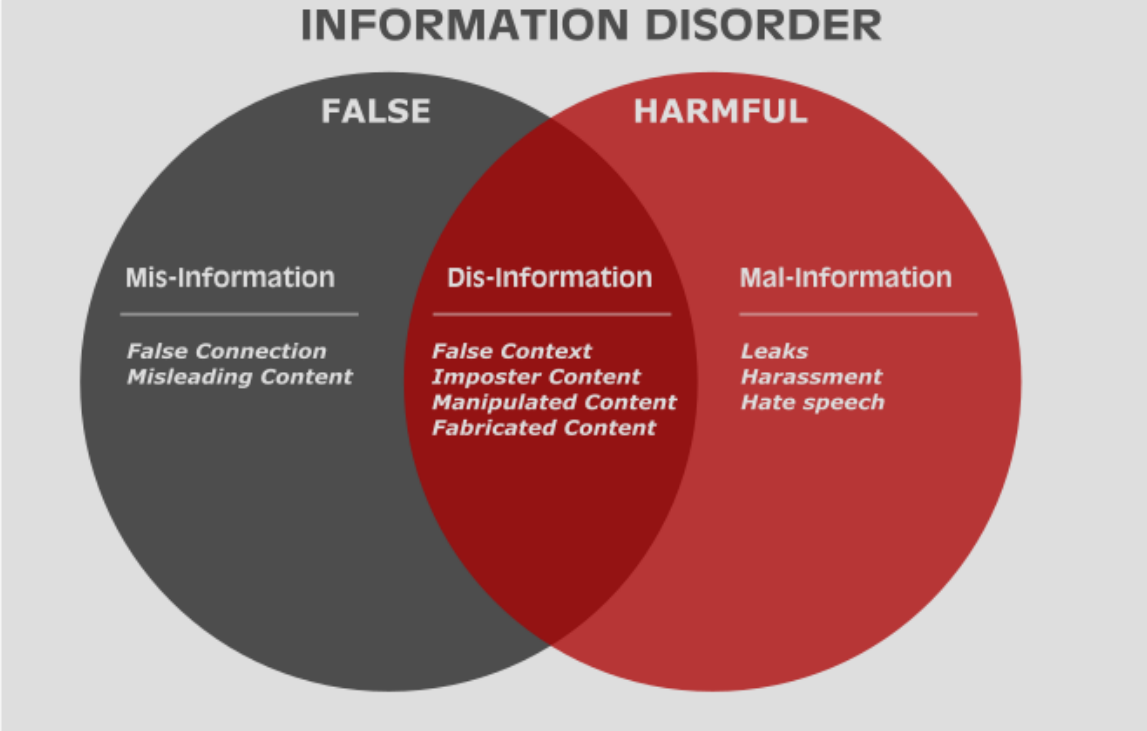

Figure 5. Components of information disorder. Source: Wardle and Derakhshan (2017).

This concept of information disorder is commonly applied in politics (Andrejevic, 2020), journalism (Wardle, 2020), and even marketing (Liu et al., 2020). In fact, according to former President Obama's communications director Dan Pfeiffer, "every policy, speech, interview, Tweet, meme, video, and photograph needs to be thought of as a piece of content that can be used to persuade voters" (Pfeiffer, 2020, para. 7). In the current political realm, information disorder serves a predominant right-leaning audience with an overall goal of preventing change rather than calling for it (Andrejevic, 2020). Commonly, a disinformation creator will weaponize irony, praying on preexisting prejudices with a focus on what can be achieved through widespread distribution (Andrejevic, 2020). For example, in 2018, Cambridge Analytica, a data firm utilized by former President Donald Trump's campaign, was shown to have collected social media information on 50 million Americans in hopes of using it to manipulate voters (Rushkoff et al., 2018). This realization led Congress to call upon Facebook CEO Mark Zuckerberg to testify on his company's data collection practices (Rushkoff et al., 2018). To combat the use of political information

disorder, Mark Andrejevic, a communications and media studies professor and researcher, states that we must develop conditions for recognition vice countering information disorder with more information disorder (2020).

Journalism, which can encompass political information disorder, constitutes a much larger realm of misinformation and disinformation (Wardle, 2020); journalism opens the door to false narratives about any topic, whether it be celebrity news or the COVID-19 pandemic (Wardle, 2020). During the era of former president Donald Trump, "fake news" became a way to describe subpar reporting by journalist in mainstream media (Wardle, 2020). However, "fake news" in journalism truly refers to information disorder and consists of manipulation in the form of "satire, clickbait, inaccurate captions, visuals, statistics, genuine content shared out of context, manipulated quotes and imagery, and outright fabricated stories" (Wardle, 2020, pp. 71-85). In order to combat this issue, Claire Wardle, the co-founder and Leader of the non-profit mis and disinformation research organization *First Draft*, recommends more research into the scale and complexities of information disorder (Wardle & Derakhshan, 2017).

Finally, marketing, which may not be the first topic of conversation when discussing information disorder, constitutes of a large number of campaigns (Newsguard, 2021). For example, researchers Jessica Liu, Sheila McLaughlin, Adrienne Lazaro, and Bonnie Halper-Felsher investigated the marketing of e-cigarettes and marijuana use, which focuses predominantly on young adults (2020). Recognizing that social media has led to a drastic increase in the use of said smoking products, the four women set out to determine what appealed to users most (Liu et al., 2020). Through a series of interviews, they were able to conclude that tobacco and marijuana users were exposed to information about the products without even subscribing to them (Liu et al., 2020). In fact, memes were one of the most widely used digital objects leading adolescents to exposure on the subject matter (Liu et al., 2020). Interestingly, however, "participants reported awareness of the tobacco industry's underlying profit-driven motives" but chose to partake anyway (Liu et al., 2020, sec. "Lack of trust in industry"). Additionally, the participants appeared to rely heavily on their friends and social media influencers for "credible" information about e-cigarettes and marijuana use (Liu et al., 2020). The research goes on to state that "recent evidence that

companies such as JUUL [e-cigarettes] use celebrities and young-looking influencers plays into this idea of trusting the source" (Liu et al., 2020, sec. "Discussion"). Liu et al.'s research accurately represents the idea that corporations, through memes and social media, can utilize information campaigns to their advantage; despite the research suggesting long-standing health problems from smoking (Blaha, 2021), they are still able to mold a narrative and sell products.

Allowing information to flow without many restrictions, like what occurs online and on social media, leads to issues for individuals attempting to sort fact from fiction. The predominance of problems that arise when analyzing information disorder occur in the mass communication and media psychology fields (Bowman & Cohen, 2020). According to Nicholas Bowman and Elizabeth Cohen, individuals face issues detecting false information due to the following reasons: cognitive dissonance, confirmation biases, cognitive shortcuts, emotional responses, social influences, mistrust, and misunderstandings (2020). After detailing the correlations between the aforementioned terms and information disorder, the authors acknowledge that they have no answers to solve the underlying problem (Bowman & Cohen, 2020). This lack of viable solutions sets the stage for a wide array of research in the area of information disorder, including the experiment designed in response to the hypotheses proposed in this thesis proposal.

D. A MEME'S ROLE IN INFORMATION DISORDER CAMPAIGNS

Briefly discussed above and in Chapter I, memes tend to blend different topics together with the intent of invoking an emotional response from the viewer (Posetti & Bontcheva, 2020). Knowing that, many state and non-state actors have begun using memes to impart meaning on topics that fit their narrative, not the true narrative (U.S. Senate, 2019). Since the 2016 presidential election, Russia has continued to "infiltrate audiences on both the left and the right, and try to pit them against each other across race, socioeconomic status, religion, and any social issue" (Graff, 2018, para. 12). In 2019, this accusation was further supported on a national level by volume two of the Select Committee on Intelligence report from the U.S. Senate, which detailed Russia's social media use during said election. For example, Figure 4 shows an image propagated on social

media by Russia in 2016 (Wyrich, 2017). These attacks are conducted by a corporation known as the Internet Research Agency (IRA), which is directed by Yevgeniy Viktorovich Prigozhin, a close ally of Vladimir Putin (Graff, 2018). Within the agency, Prigozhin funded an operation known as "Project Lakhta," whose purpose was to widen the political divide within the United States (Graff, 2018). Additionally, after failed attempts to influence American attitudes via Twitter, China "built a machinery of online controls that far exceed any other country's" (Meyers & Mozur, 2019, para. 14). In fact, evidence has concluded that China is now working similarly to Russia, "promoting negative messages about other states" in an attempt to divide groups (Weitz, 2020, para. 1). Even more concerning, the two nations have agreed to work together in future disinformation campaigns (Weitz, 2020). The success that Russia has seen in operations waged at free societies, specifically in the 2016 election, should raise concerns for all American citizens, especially if two peer threats are now corroborating (Calabresi, 2017; Weitz, 2020).

Although 2016 was previously considered the most meme-filled presidential election, according to *CNN* and *BBC* journalists, the 2020 one was even more fraught with them (Cillizza, 2020; Fabbri, 2020). Chris Cillizza, the editor for CNN's "Point" newsletter, discussed that, because former President Donald Trump was the most memed president in history, it set the stage for political campaigns run the same way (2020). Unsurprisingly, the American people like it this way; as a nation, we have become dependent on skimming for information, not actually reading, and memes allow us to gain info and move on quickly (Cillizza, 2020). According to Thomas Fabbri, a data analyst for *BBC News*, five main voices, running four overall accounts, were behind the memes of the 2020 election: Dan Bongino, Franklin Graham, James Woods, and Rafael and Omar Rivero (2020). Dan Bongino, who created and shared far-right conservative memes and commentary on his Facebook, was receiving more shares than *Fox News*, *CNN*, and *The New Work Times*, amassing to seven million in October of 2020 (Fabbri, 2020). Franklin Graham and James Woods, more conservative political election influencers, were also among the top meme generators and propagators, consistently spreading conspiracy theories about the left agenda. Finally, twins Rafael and Omar Rivero, who run the account "Occupy Democrats," were the main source of democratic memes during the election,

gaining more shares than former President Trump's account on multiple occasions (Fabbri, 2020). While those five men all reside in the United States, many suspect that Russia, China, and Iran implanted their own meme driven narratives like the 2016 election (Corera, 2020). In fact, the United States government recently imposed sanctions on Russia for their state-sponsored roles in influencing the 2020 election (White House, 2021). While a full report, like that detailing the use of memes in the 2016 election will not be available for some time, it is likely that their involvement only went up after seeing previous success.

However, the use of memes in information disorder does not stop with political elections. In April 2020, the International Center for Journalists and the United Nations (UN-ICFJ) conducted a review of the disinformation being spread during the current COVID-19 pandemic (Posetti & Bontcheva, 2020). Their research revealed that, of the four main formats used for disinformation spread, memes accounted for two: emotive narrative constructs and memes, and "fraudulently altered, fabricated, or decontextualized images and videos" (Posetti & Bontcheva, 2020, sec. "The four main formats of COVID-19 disinformation"). The first format often mixes elements of truth with emotion, lies, and personal opinion, while the second format attempts to spread false stories, create confusion, and generate distrust (Posetti & Bontcheva, 2020). Although some memes have been used to propagate simple jokes or awareness of the deadliness of the virus, like Ghana's dancing pallbearers (BBC, 2020), others have been used with malicious intent; during the initial ages of COVID-19 spread, China began using memes and other techniques to convince European nations and Japan that U.S. service members spread the virus in their countries (Weitz, 2020). Additionally, the Chinese Communist Party offered to pay Twitter users with greater than 10,000 followers to share propaganda that discussed their superior handling of the pandemic (Kao & Li, 2020). The utilization of memes to spread disinformation about an ongoing pandemic solidifies the importance of studying what groups are more susceptible to this type of messaging.

E. TWITTER'S ROLE IN INFORMATION DISORDER

Dan Pfeiffer, a former White House communications director, states that "political campaigns are now modern information warfare—massive state-adjacent propaganda

operations with Twitter bots that fuel outrage and drive media coverage" (Pfeiffer, 2020, para. 2). When attempting to spread a misleading narrative via Twitter, many organizations utilize software robots, or bots (Bessi & Ferrara, 2016). Bots, which have been used to influence politics since 2010, are somewhat difficult to identify with the untrained eye (Bess & Ferrara, 2016). However, using a public website and Python code, the machine learning framework known as BotOrNot identifies fake accounts with 95% accuracy (Bess & Ferrara, 2016). Utilizing BotOrNot and Twitter Search API, researchers Alessandro Bessi and Emilio Ferrara were able to show that, between the five weeks leading up to the 2016 presidential election, bots created 19% of all election-related Tweets, amassing to an astounding 3.8 million posts (2016). After identifying all the robot Tweets, Bessi and Ferrara applied SentiStrength, a sentiment analysis tool, to the bot posted Tweets and compared them to human-generated Tweets (2016). In doing so, Bessi and Ferrara showed that all Donald Trump related Tweets, human and bot, were positive in nature (2016). However, the Hilary Clinton Tweets published by bots were slightly less positive than those published by humans (2016). This difference in SentiStrength score highlights the importance of understanding who is running these bot accounts, which, in the following years, was found to be predominately Russian based offensive attacks aimed at influencing the presidential election (Timberg & Dwoskin, 2018).

While any user has the ability to post whatever he or she desires, a set of rules determine what remains online; in fact, between January 2019 and June 2020, Twitter suspended over 2.5 million accounts for things like terrorism, violent extremism, and child sexual exploitation (Twitter, 2021). While no Twitter suspensions are explicitly stated as contributing to misinformation, the website maintains guidelines and policies that restrict the spread of false information; for example, the COVID-19 misleading information policy explicitly states that "you may not use Twitter's services to share false or misleading information about COVID-19 which may lead to harm" (Twitter, 2021b, sec. "Overview"). However, after a scan of the Twittersphere (also known as Twitterverse), it is fraught with it.

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III. RELATED WORK

It is important to understand where current research stands on memetics, Twitter, information disorder, and initial categorization to better grasp the experimental design detailed in the follow-on chapter. The sub-sections under each section denote the names of published articles, all of which were released in 2015 or later, and the body below summarizes the research conducted and its findings.

A. RESEARCH ON INFORMATION DISORDER WITH MEMES

The following sub-sections provide insight into information disorder research that focuses on the use of memetics on social media.

1. Political Memes and Fake News Discourses on Instagram

Ahmed Al-Rawi, an Assistant Professor of News, Social Media, and Public Communication at Simon Fraser University, devoted time to researching information disorder on Instagram by collecting 293,7773 posts with a search for "#fakenews" (2021). While the tools used to collect the posts pulled from 2012 to 2018, there appeared to be a central topic: politics (Al-Rawi, 2021). Through topic modeling and pivot tables, Ahmed Al-Rawi was able to determine that 69.2% of posts utilizing fake news discourse originated from Pro-Trump communities, with the next closest community being Anti-Trump at 13.9% of posts (Al-Rawi, 2021). Interestingly, most of the top 20 active users posting #fakenews images are self-proclaimed meme sites, like @conservative_americans and @Captain_Kekistan (Al-Rawi, 2021). With this information, we can hypothesize that Pro-Trump groups are aware of information disorder around them, but it is unclear if they are simply using the fake news hashtag for anything that goes against their belief system or truly believe the shared information is inaccurate.

2. Inferring Social Influence and Meme Interaction with Hawkes Processes

In 2015, researchers Chuan Luo, Xiaolong Zheng, and Daniel Zeng, who work at the Chinese Academy of Sciences State Key Laboratory of Management and Control for

Complex Systems, noticed that no model existed to explain social influence and meme interaction (2015). Their study aimed to predict what effect influence had on users posting memes about the same or a similar topic; for example, if user X posts a meme about a democratic political candidate, user Y may be influenced to post the same meme or, perhaps, a republican one (Luo et al., 2015). Using a multidimensional Hawkes processes, which is a statistical method for explaining "that each arrival increases the rate of future arrivals for some period of time" (Laub et al., 2015, p. 1), Luo, Zheng, and Zeng, created a model that accurately displayed the user behavior related to 15 million Twitter posts centered on political events in Spain (2015). This successful model application allows follow-on researchers to estimate the propagation rate of memes regarding a specific topic, whether they are misinformation or true information.

3. The Evolution of Political Memes: Detecting and Characterizing Internet Memes with Multi-Modal Deep Learning

David Beskow, Sumeet Kumar, and Kathleen Carley, researchers at the School of Computer Science Carnegie Mellon University, hypothesized that, as memes propagate, they transform, eventually reaching greater depths of the internet than traditional images (2020). Through the utilization of various deep learning methods, the researchers were able to classify 5,000 meme and 5,000 non-meme images related to the 2018 U.S. midterm elections into various groups of content, or families (Beskow et al., 2020). Using Google Vision API to conduct a reverse image lookup, Beskow, Kumar, and Carley found that the meme images returned 62,475 matching links, while the non-meme images only returned 9,536. Crunching those numbers, the researchers found that memes were four times more likely to return search results, demonstrating that memes propagate to wider areas of the internet than images alone (Beskow et al., 2020).

B. RESEARCH ON INFORMATION DISORDER USING TWITTER

The following sub-sections provide insight into information disorder research that uses Twitter as a propagation platform.

1. Coronavirus Goes Viral: Quantifying the COVID-19 Misinformation Epidemic on Twitter

In 2020, 10 medical faculty at the American University of Beirut ran an experiment that reviewed Tweets based solely on COVID-19 (Kouzy et al., 2020). In a single day, the researchers collected 673 Tweets that corresponded to 14 trending hashtags (Kouzy et al., 2020). Upon review of all Tweets, Kouzy et al. found that, while 81.4% of Tweets had true information, 24.8% included misinformation, meaning some Tweets contained both (2020). Interestingly, 33.8% of personal/group Twitter accounts contained misinformation, while only 18.6% of news outlets/journalist Tweets reviewed contained misinformation (Kouzy et al., 2020). Finally, the researchers did not find any correlation between the number of likes or retweets and the occurrence of misinformation (Kouzy et al., 2020).

2. The Spread of True and False News Online

Rather than focus on the spread of false information centered on one topic, researchers Soroush Vosoughi, Deb Roy, and Sinan Aral from the Massachusetts Institute of Technology (MIT) looked at how true and false information propagate as a whole (2018). The MIT researchers pulled approximately 126,000 true and false news focused Tweets from 2006 to 2017 that had cascaded via retweets and comments more than 4.5 million times (Vosoughi et al., 2018). From there, Vosoughi et al. was able to quantify depth, size, breadth, and structural virality of the cascades (2018). Interestingly, the researchers found that "falsehood diffused significantly farther, faster, deeper, and more broadly than the truth in all categories of information" (Vosoughi et al., 2018, sec. "Abstract"). In fact, the model used by the researchers showed that false Tweets are retweeted 70% more often than true ones (Vosoughi et al., 2018). Additionally, Vosoughi et al. analyzed false Tweets to speculate on why they were being retweeted at greater rates, which led them to determine that they contained more novelty than true Tweets (2018). The authors noted that novelty was only speculation and more research was needed to determine the true reason false Tweets are spread at greater rates (Vosoughi et al., 2018); the experiment designed in this thesis aims to draw some conclusions between that gap in literature.

C. INFLUENCE EFFECTIVENESS OF INFORMATION DISORDER

The following sub-sections provide insight into the effectiveness of information disorder and propaganda. Currently, the research involving information disorder influence effectiveness on social media is limited, so the topics summarized below span an array of delivery methods. Propaganda, which uses both true (like malinformation mentioned in the previous chapter) and false information to push a specific narrative, is a common term used when reading about information disorder (Wardle & Derakhshan, 2017). Propaganda and information disorder, however, vary slightly in that propaganda emphasizes emotional response at greater depths than information disorder (Wardle & Derakhshan, 2017). However, both are influence operations, making propaganda effectiveness an important aspect of this thesis.

1. Does Russian Propaganda Work?

Beginning in the mid-2000s and increasing when Vladimir Putin regained office in 2012, Russia has been utilizing propaganda to influence its citizens and those abroad (Gerber & Zavisca, 2016). The propaganda, which begins as official government statements and propagates through mass media and social media, seeks to legitimize current government efforts and project power internationally (Gerber & Zavisca, 2016). Understanding the political influence state-run propaganda can have, researchers Theodore Gerber, a sociology professor at the University of Wisconsin-Madison, and Jane Zavisca, the associate dean for Research, College of Social & Behavioral Sciences at the University of Arizona, sought to determine how effective the Russian propaganda had been on its audiences (2016). To answer their research questions, Gerber and Zavisca surveyed citizens in Russia, Ukraine, Azerbaijan, and Kyrgyzstan (2016). Upon review and analysis, they found that the Russian propaganda was effective within the borders of their country, but not nearly as effective outside of it (Gerber & Zavisca, 2016). From their research, Gerber and Zavisca found that 85% of Russians surveyed viewed the United States as an enemy or rival, while only 8% of Ukrainians felt the same way (2016). Azerbaijan, which totaled 24% for enemy or rival, was nearly even with Kyrgyzstan, who totaled to 23% (Gerber & Zavisca, 2016). In their conclusion, Gerber and Zavisca note that there is not a

great solution to counter the propaganda that has been effective in neighboring Russian countries because the media is greatly controlled by Russia (2016).

2. Understanding What Makes Terrorist Groups' Propaganda Effective: An Integrative Complexity Analysis of ISIL and Al Qaeda

According to Michael Leiter, the former director of the U.S. Counterterrorism Center, ISIL maintains a constant presence on social media, pushing out propaganda nearly 24 hours a day (Houch et al., 2017). In 2015, it was estimated that, along with other media utilization, ISIL consistently gained 1,000 members monthly (Houch et al., 2017). Through an analysis of the integrative complexity seen in ISIL propaganda, researcher Shannon Houck from Syracuse and researchers Meredith Repke and Lucian Conway III from the University of Montana evaluated what makes ISIL propaganda more effective than Al Qaeda (2017). Houck et al. determined that ISIL used increasingly more simplistic messaging than Al Qaeda, hypothesizing that either ISIL realizes complexity of messaging fails to reach target audiences or they just happen to be sending out simpler propaganda (2017). The research completed by this team backs up previous research that showed "when a group is seeking to gain power, less complexity is more effective for garnering power and achieving political success" (Houck et al., 2017, sec. "Why might Al Qaeda and ISIL differ?").

D. CATEGORIZATION AND DECISION MAKING

When an individual reaches a decision point, like a judge determining if a defendant is guilty, they must assign a category (Wang & Busemeyer, 2016). This categorization, like the judge determining that he/she is, in fact, guilty, leads to follow-on action, like assigning punishment (Wang & Busemeyer, 2016). In the cognitive sciences field, researchers hypothesize that, if an individual is required to announce their categorization prior to action, they may make a different choice than had they acted without reporting first (Wang & Busemeyer, 2016). For example, if a police officer categorizes an individual as having a weapon, then reports that the suspect has a weapon prior to acting, rather than shooting immediately, the outcome may be different (Wang & Busemeyer, 2016). Knowing that, the experimental design detailed in Chapter Four incorporates initial categorization,

attempting to address whether said categorization truly affects the way an individual interacts with information. Below, recent works in the field of categorization and decision making are summarized, allowing the reader to gain an understanding that will translate when viewing the follow-on chapter.

1. Interference Effects of Categorization on Decision Making

Researchers Zheng Wang of The Ohio State University and Jerome Busemeyer of Indiana University utilized multiple models, including the Markov model, Signal detection model, and Quantum model, to study category-decision linked tasks (2016). During three slightly varied experiments, the researchers presented participants with images of faces where some had been categorized (through a label) as displaying a good guy (g) or bad guy (b), some were required to be categorized by the participant, and some lacked categorization completely (Wang & Busemeyer, 2016). Once viewing the face, and categorizing as necessary, participants would decide whether to attack the individual or withdraw (Wang & Busemeyer, 2016). After reviewing the results and applying the three models listed previously, Wang and Busemeyer were able to identify inference effects (statistical conclusions about the data) that occurred between trials with categorization and without categorization (2016). The occurrence of these inference effects, which existed in some predicted and some unpredicted places, highlights the ability for categorization to change the way an individual views something, as well as their follow-on decision (Wang & Busemeyer, 2016).

2. An Evidential Dynamical Model to Predict the Interference Effect of Categorization on Decision Making Results

While the above experiment utilized the Quantum, Markov, and Signal Detection models to find inference effects, researchers Zichang He and Wen Jiang of Northwestern Polytechnical University created a new evidential dynamic model (2018). Through the integration of Dempster-Shafer evidence theory and quantum dynamical modelling, He and Jiang's model successfully illustrated category-decision task inference effects without the need for integrating multiple experiments and models together (2018). To be successful, He and Jiang created the model to measure the handling of uncertain states in

action, which is different than the aforementioned, which measures an “entanglement of beliefs and actions” (2018, p. 140). By creating a new model that provides the same effectiveness and efficiency of previous models, He and Jiang were able to show once again that categorization influences follow-on decision making (2018).

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IV. METHODOLOGY

The experiment designed in this chapter aims to answer the hypotheses presented in Section A by creating a survey that can, if released for public participation, highlight possible correlations between the acceptance and propagation of false information and age, education, and gender, as well as the effect of initial categorization on decision making. In Section A, the hypotheses from Chapter I are presented again. In Section B, an overview of the experiment is detailed, which includes information on the participants and setting (online delivery). In Section C, the Tweets and memes used in the experiment are presented. Section D contains a detailed description (with figures) of how the experiment was built in Qualtrics. Finally, Section E discusses limitations of the experiment designed.

A. HYPOTHESES

The experiment designed in this chapter aims to answer the following hypotheses:

- HA1: Age correlates to the acceptance of false information spread through a Tweet and an image macro meme.
- HA2: Education level correlates to the acceptance of false information spread through a Tweet and an image macro meme.
- HA3: Gender correlates to the acceptance of false information spread through a Tweet and an image macro meme.
- HA4: Age correlates to the propagation of false information spread through a Tweet and an image macro meme.
- HA5: Education level correlates to the propagation of false information spread through a Tweet and an image macro meme.
- HA6: Gender correlates to the propagation of false information spread through a Tweet and an image macro meme.

- HA7: Initial categorization has an effect on the acceptance of false information spread through Tweets and image macro memes.
- HA8: Memes will be interacted with (by indication of liking, commenting, or sharing) at a different rate than Tweets.

B. EXPERIMENTAL DESIGN OVERVIEW

If individuals were to take the experiment as it is designed currently, the participants first view instructions for the experiment, then provide consent to participate, and finally give their age, gender, and education. Age is broken down into the following groups: 18–25, 26–33, 34–41, 42–49, 50–57. Gender is disclosed as preferred sex (not assigned), containing options for male or female. Education is broken down by the following selections: high school diploma, associate's degree, undergraduate level schooling in progress, bachelor's degree, graduate-level schooling in progress, master's degree, doctorate-level schooling in progress, and doctorate degree. Please see Table 1 for an overview of the variables collected.

Table 1. Variables collected during the experiment

Factors	Levels
Age	5 levels
Education	8 levels
Gender	2 levels
Meme (With and Without) Tweet	2 levels
Categorization (With and Without) Tweet	2 levels

Following those selections, participants will begin the experiment. Each participant will randomly start with one of the following four groups and proceed on the path outlined in Figure 6: seven simulated Tweets with initial categorization questions (set one), seven simulated Tweets without initial categorization questions (set two), seven image macro memes with initial categorization questions (set one), or seven image macro memes without initial categorization questions (set two). All Tweets and image macro memes contain inaccurate information centered on COVID-19 and can be viewed later in this

chapter. Set one and Set two denote the line of questioning that appears with the Tweet or image macro meme and can be viewed below the experimental flow chart.

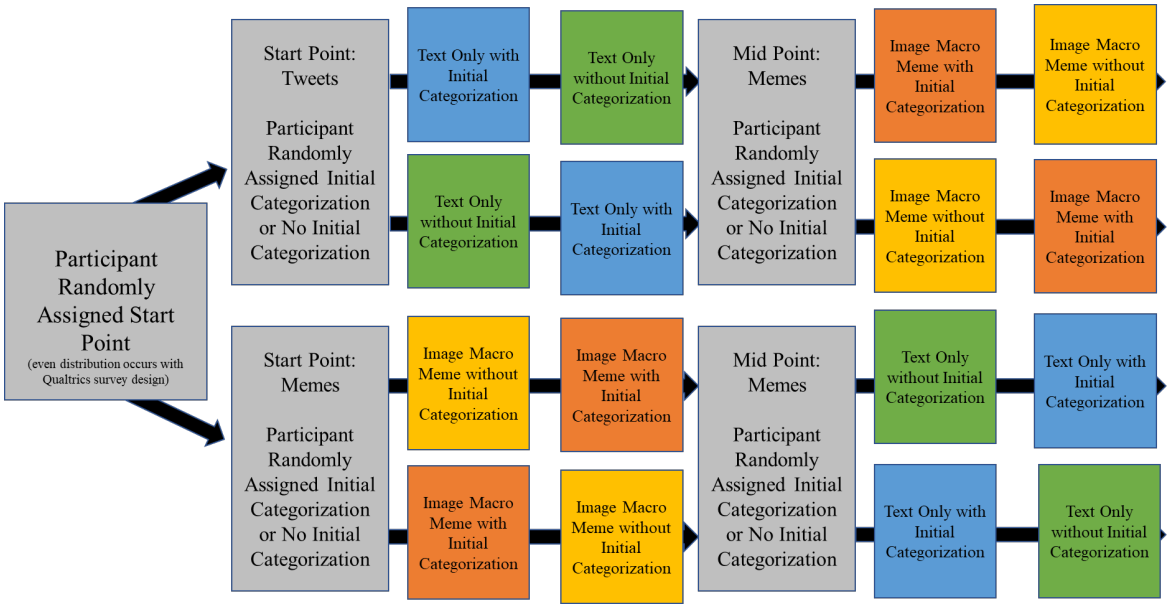

Figure 6. Experiment flow chart

When designing the questions, it was important to offer participants a selection for any reason they may interact with the Tweet or meme. Because memes are generally viewed as humorous, that was included in the top spot. A selection of "A" or "C" (Affiliated with my personal views) in question set one or two will help guide research analysis; interacting with a Tweet or meme because it is humorous or affiliated with person views will help propagate but does not indicate susceptibility to information disorder. However, because the experiment is built to measure susceptibility between different independent variables, participants may select "Accurate information" or a combination of "Accurate information" with "Humorous" or "Affiliated with my personal view." If that is selected, it will assist researchers in finding correlations between susceptibility and the independent variables. Below, the question sets are presented. Set one includes initial categorization, while set two does not.

Set One of questioning:

1. Would you interact with this Meme/Tweet on social media (Facebook, Instagram, Twitter, etc.) by liking, commenting, or sharing the post?
    a. Yes
    b. No
2. If YES, why would you interact with this Meme/Tweet on social media?
    a. Humorous
    b. Accurate information
    c. Affiliated with my personal views
    d. Humorous and Accurate Information
    e. Humorous and Affiliated with my personal view
    f. Accurate information and Affiliated with my personal views
    g. Disagree with information
3. If NO, why wouldn't you interact with this Meme/Tweet on social media?
    a. Not active on social media
    b. Inaccurate information
    c. Goes against my personal views
    d. Not active on social media and Inaccurate information
    e. Not active on social media and Goes against my personal views
    f. Inaccurate information and Goes against my personal views
    g. Disagree with information

Set Two of questioning:

1. Why would you interact with this Meme/Tweet on social media (Facebook, Instagram, Twitter, etc.) by liking, commenting, or sharing the post?
    a. Humorous
    b. Accurate information
    c. Affiliated with my personal views
    d. Humorous and Accurate Information
    e. Humorous and Affiliated with my personal view
    f. Accurate information and Affiliated with my personal views
    g. Disagree with information
    h. I would not interact with this on social media

After each participant has completed all four sections, they are shown a disclaimer that tells them that all the information seen in the experiment was manipulated into false information. This will prevent any participant from falling victim to misinformation as a result of this research. The way in which the information was manipulated is described below each tween and meme presented in the next section.

C. TWEETS AND MEMES USED

Below, every Tweet and image macro meme used in the experimental design is presented. Underneath each figure, the reasoning for the particular Tweet or meme is detailed. First, all 14 Tweets will be presented. Following that, all 14 memes will be presented.

1. Tweets Used in the Experimental Design

To create the 14 Tweets used in this experiment, many things were taken under consideration. First and foremost, the creation source was selected: www.tweetgen.com. This site allows the user to adjust the theme, add a profile picture, create a name, insert a Twitter handle, make the account verified, add Tweet content, insert an image, and adjust the time, date, retweets, and likes. Next, it was important to select a widely recognizable news sources' Twitter profile and mimic it exactly. Had a lesser-known source been selected, it was feared that participants would not trust the source, and, in turn, that would skew their answers to the experiment questions.

Having 48.7 million followers on Twitter, *The New York Times* was deemed a good model and all Tweets were created to match its profile. As seen in Figure 7, the image, name, and Twitter handle is the same as the real version. Additionally, the account appears verified, just like it is online. Finally, if the Tweet was modeled directly after a real *The New York Times* Tweet, the retweets and likes were also modeled directly after the original Tweets retweets and likes at the time of creation. However, if the Tweet was modeled after a different source, the retweets and likes were randomly generated on the www.tweetgen.com site.

Below, all 14 Tweets used are presented. Beneath each Tweet, the reasoning for the Tweet content is briefly explained.

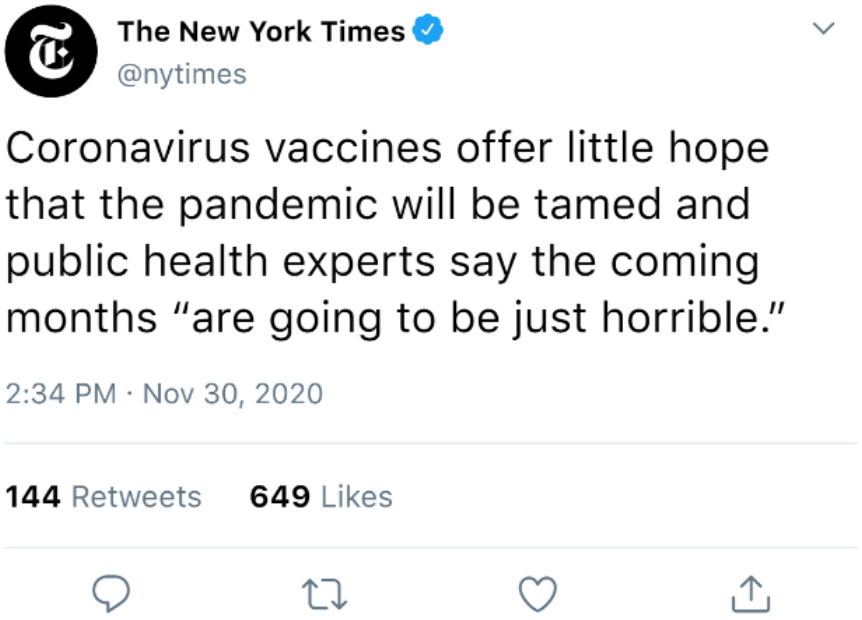

Figure 7. Tweet number one. Adapted from *The New York Times* (2021).

Tweet number one was modeled directly after a Tweet posted by *The New York Times* on November 30, 2020, that stated: "Good news about coronavirus vaccines offers hope that the pandemic will be tamed. But public health experts say the coming months "are going to be just horrible." In an attempt to make it misinformation, the Tweet was altered to remove the beginning words and now contains the word "little" before "hope." As a result, the fake Tweet does not make the COVID-19 vaccine look like a solution to the pandemic and creates a sense of doom.

Figure 8. Tweet number two. Adapted from *The New York Times* (2021).

Tweet number two was created in response to real conspiracy theories that claim hospitals are inflating numbers of COVID-19 related deaths in an attempt to benefit financially (Knight & Appleby, 2020).

Figure 9. Tweet number three. Adapted from *The New York Times* (2021).

Tweet number three was modeled directly after a Tweet posted by *The New York Times* on February 16, 2021, that stated: "North Korea has tried to steal Covid-19 vaccine and treatment technology by attempting to hack international pharmaceutical companies, including Pfizer, a South Korean lawmaker said on Tuesday after a briefing by intelligence officials." The date, reTweets, quote Tweets, and likes were taken directly from the original Tweet (on February 16, 2021). To make this misinformation, the country of North Korea was replaced with Russia, and the identifier of "South Korean lawmaker" was removed. As a result, the Tweet presents Russia as the intelligence threat, not North Korea.

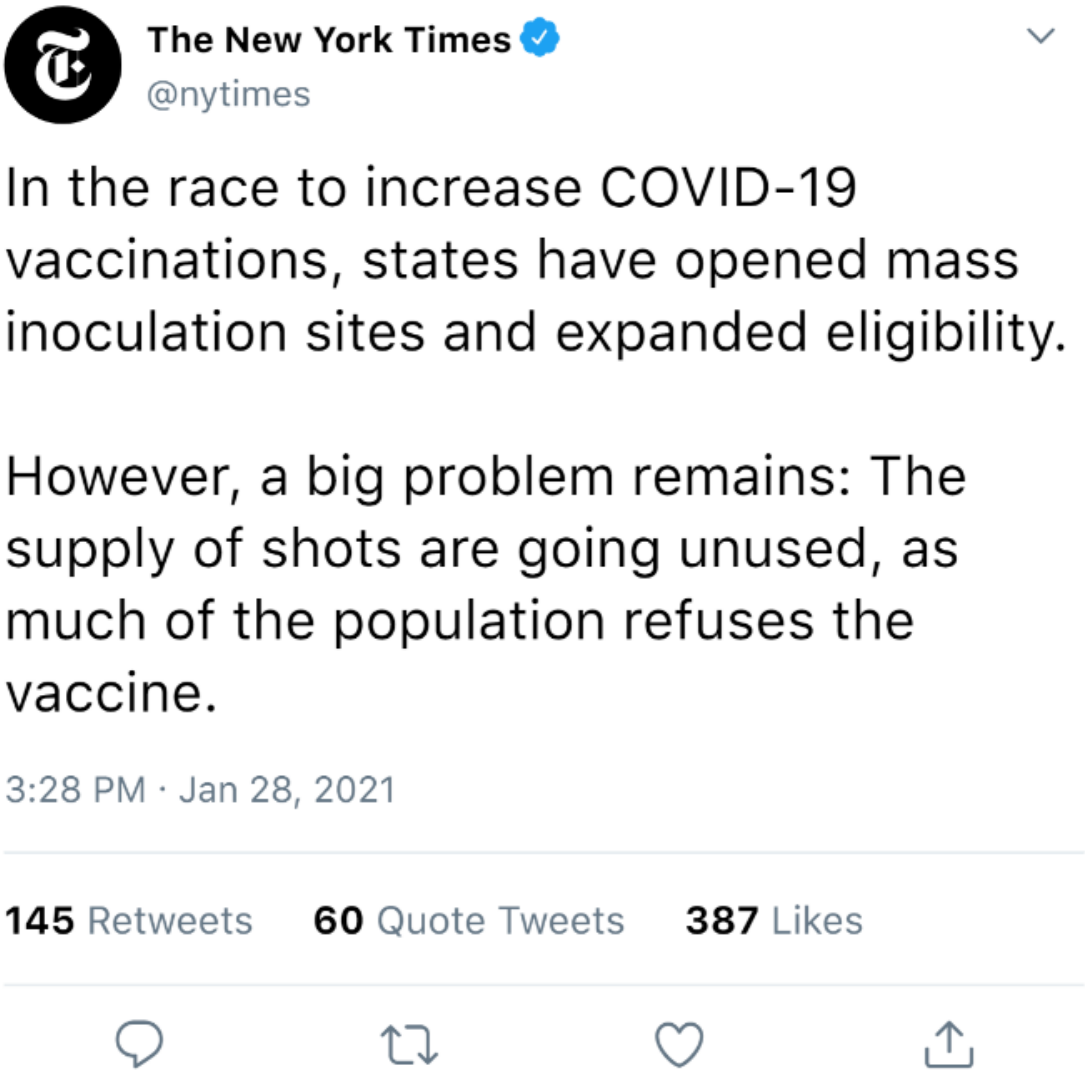

Figure 10. Tweet number four. Adapted from *The New York Times* (2021).

Tweet number four was modeled directly after a Tweet posted by *The New York Times* on February 15, 2021, that stated: "In the race to increase Covid-19 vaccinations, states have opened mass inoculation sites and expanded eligibility. But a big problem remains: The supply of shots isn't increasing fast enough." The reTweets, quote Tweets, and likes were taken directly from the original Tweet (on February 16, 2021). To make this misinformation, the big problem was changed to a lack of participants instead of vaccine supply.

Figure 11. Tweet number five. Adapted from *The New York Times* (2021).

Tweet number five was modeled directly after a Tweet posted by *The New York Times* on February 14, 2021, that stated: "A team of experts selected by the WHO to investigate the origins of the coronavirus returned last week from Wuhan. They plan to produce a joint report on the virus, which they agree most likely originated from an animal – and not a lab." The date, reTweets, quote Tweets, and likes were taken directly from the original Tweet (on February 16, 2021). In the manufactured Tweet, the virus was said to be manufactured in a lab (vice naturally occurring in an animal), appealing to individuals that believe COVID-19 was created as a bioweapon.

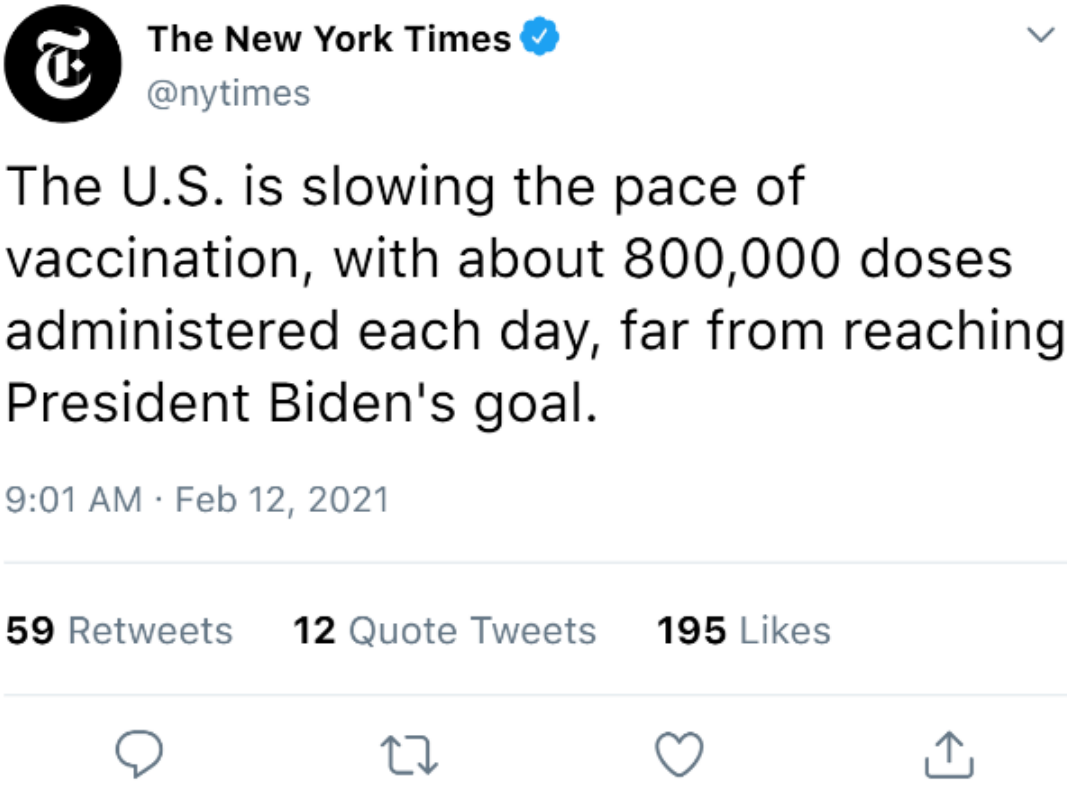

Figure 12. Tweet number six. Adapted from *The New York Times* (2021).

Tweet number six was modeled directly after a Tweet posted by *The New York Times* on February 12, 2021, that stated: "The U.S. is also picking up the pace of vaccination, with about 1.6 million doses administered each day, exceeding President Biden's goal." The date, reTweets, quote Tweets, and likes were taken directly from the original Tweet (on February 16, 2021). The number of vaccinations occurring daily, as well as the perceived pace (slowing vice picking up) was altered to make it appear like President Biden is not reaching his goal for the nation.

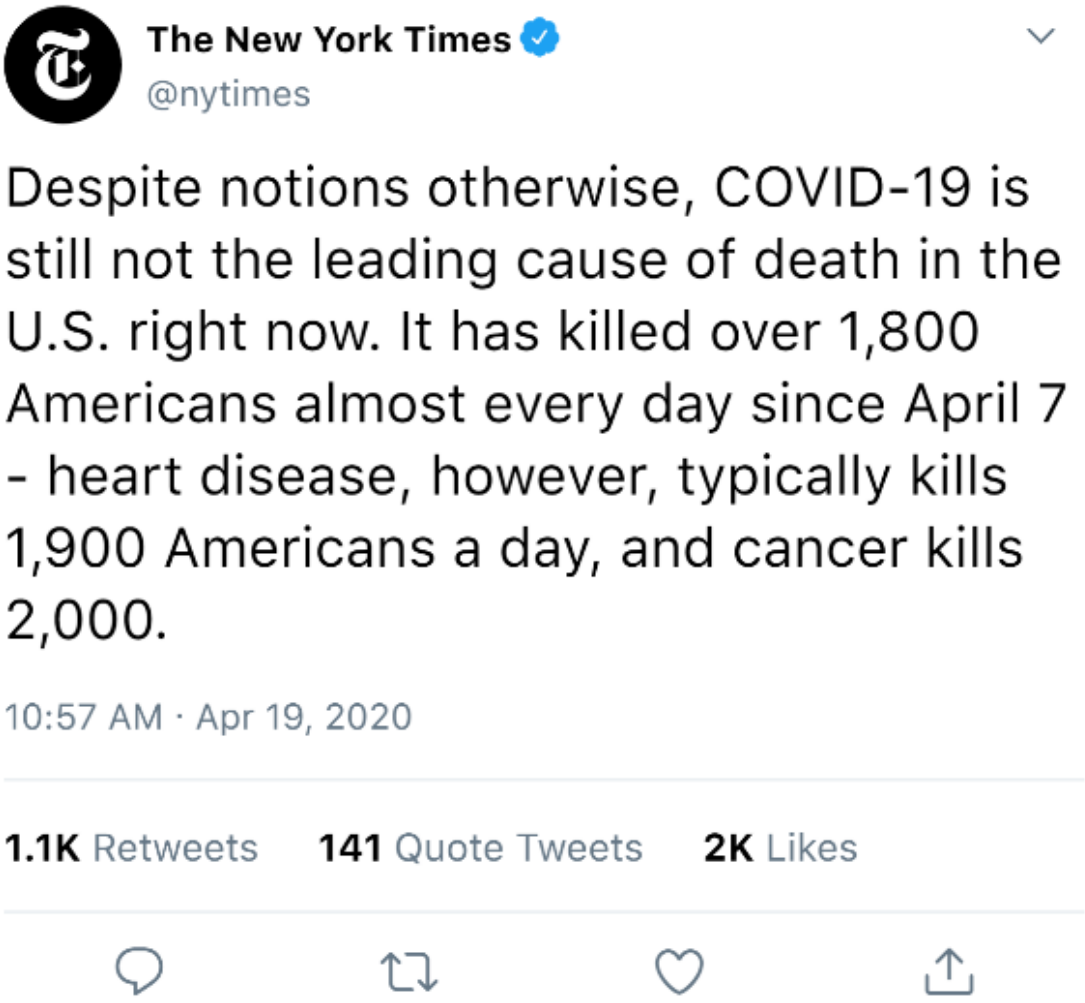

Figure 13. Tweet number seven. Adapted from *The New York Times* (2021).

Tweet number seven was modeled directly after a Tweet posted by *The New York Times* on April 19, 2020, that stated: "COVID-19 is arguably the leading cause of death in the U.S. right now. It has killed over 1,800 Americans almost every day since April 7 – heart disease typically kills 1,774 Americans a day, and cancer kills 1,641." The date, reTweets, quote Tweets, and likes were taken directly from the original Tweet (on February 16, 2021). This manufactured Tweet was altered to make heart disease and cancer a bigger threat than COVID-19.

Figure 14. Tweet number eight. Adapted from *The New York Times* (2021).

Tweet number eight was modeled directly after a Tweet posted by *The New York Times* on January 9, 2020, that stated: "There's no evidence that the virus, a coronavirus, is readily spread by humans, and it has not been tied to any deaths. But health officials in China and internationally are watching it carefully." The date, reTweets, quote Tweets, and likes were taken directly from the original Tweet (on February 16, 2021). The alteration of the original Tweet creates a narrative that world leaders knew the early dangers of COVID-19 and chose to ignore them.

Figure 15. Tweet number nine. Adapted from *The New York Times* (2021).

Tweet number nine was modeled directly after a Tweet posted by *The New York Times* on May 10, 2020, that stated: "What's clear: A one-time social distancing effort won't be sufficient to control the coronavirus, and it will take a long time to reach herd immunity. Without an effective vaccine, our pandemic state of mind may persist well into 2021 or 2022." The date, reTweets, quote Tweets, and likes were taken directly from the original Tweet (on February 16, 2021). Changing the Tweet to state that one-time social distancing will, in fact, be enough to combat the pandemic, transforms the original message to misinformation.

Figure 16. Tweet number ten. Adapted from *The New York Times* (2021).

Tweet number ten was modeled directly after a Tweet posted by *The New York Times* on December 19, 2020, that stated: "Early in the coronavirus outbreak, Chinese authorities clamped down on information to make the virus look less severe, and the government more capable, thousands of secret government directives and other documents reviewed by @nytimes and @propublica show." The date, reTweets, quote Tweets, and likes were taken directly from the original Tweet (on February 16, 2021). By replacing "Chinese" with "U.S." authorities, we create mistrust towards our government, which is rooted in misinformation.

Figure 17. Tweet number eleven. Adapted from *The New York Times* (2021).

Tweet number eleven was modeled directly after a Tweet posted by *The New York Times* on December 8, 2020, that stated: "The coronavirus vaccines will probably prevent you from getting sick with Covid-19. But it's not yet clear whether you can still get infected asymptomatically and silently spread the virus." The date, reTweets, quote Tweets, and likes were taken directly from the original Tweet (on February 16, 2021). Slightly changing the Tweet to state that the vaccine will not prevent you from catching the virus, vice maintaining an unsure position, turns this into subtle misinformation.

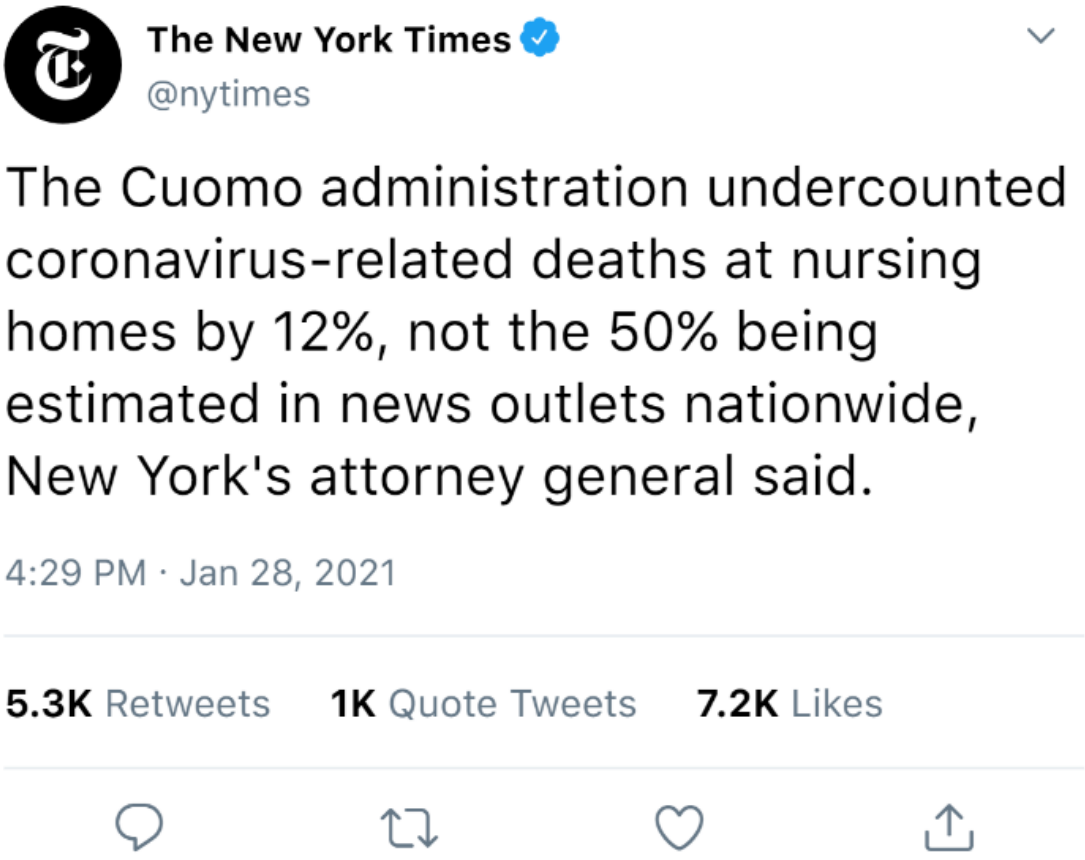

Figure 18. Tweet number twelve. Adapted from *The New York Times* (2021).

Tweet number twelve was modeled directly after a Tweet posted by *The New York Times* on January 28, 2021, that stated: "The Cuomo administration undercounted coronavirus-related deaths at nursing homes by as much as 50%, New York's attorney general said." The date, reTweets, quote Tweets, and likes were taken directly from the original Tweet (on February 16, 2021). This misinformation alteration attempts to delegitimize the accusations that New York Governor Cuomo greatly underreported COVID-19 deaths in nursing homes, while the truth is quite the opposite.

Figure 19. Tweet number thirteen. Adapted from The *New York Times* (2021).

Tweet number thirteen was modeled directly after a Tweet posted by *The New York Times* on February 16, 2021, that stated: "The pandemic has taken over most children's lives – shutting down in-person school, sports and socializing. That has prompted some teenagers, who otherwise feel powerless, to fight back by volunteering for vaccine trials." The date was taken directly from the original Tweet, while the reTweets, quote Tweets, and likes were randomized by the Tweet generation website. The manipulation of this Tweet creates misinformation by framing teenagers as rude and vindictive.

Figure 20. Tweet number fourteen. Adapted from *The New York Times* (2021).

Tweet number fourteen was modeled directly after a Tweet posted by *The New York Times* on February 16, 2021, that stated: "House Democrats are barreling toward passage of President Biden's $1.9 trillion economic relief package, with a vote on the final legislation expected by the end of the month." The date, reTweets, quote Tweets, and likes were randomized on the Tweet generation website. Changing "Democrats" to "Republicans" paints the picture that there is bipartisan support, making the overall message into misinformation.

2. Memetics Used in Experimental Design

The image macro memes used in this experiment were created by the author on the website https://www.imgflip.com/memegenerator. All images used were selected from the

"Expanding Brain" on the imgflip site, specifically under the "Popular" tab. A link to the meaning of each image selected is provided in the description of each meme created. The various content of the memes were inspired by conspiracy theories and popular misinformation campaigns that have been widespread throughout the current pandemic.

Figure 21. Meme number one. Adapted from Bremmer (2020).

Meme number one was inspired by a *Time* article entitled "The Best Global Responses to COVID-19 Pandemic" (Bremmer, 2020). The article protests that, as of June 2020, the epicenter of the pandemic was in the United States (Bremmer, 2020). Following that, it lists other nations that did a better job than the United States at controlling the spread of the virus (Bremmer, 2020). By suggesting that every other nation, not just some nations, have slowed the spread better than the U.S., this misinformation memetic spreads distrust in the U.S. Government handling of the pandemic itself. To learn more about the image behind this meme, visit https://knowyourmeme.com/memes/but-thats-none-of-my-business.

Figure 22. Meme number two. Adapted from Lynas (2020).

Meme number two was inspired by a widespread conspiracy theory that 5G is spreading COVID-19 via the electromagnetic spectrum (Lynas, 2020). According to believers, the rollout of 5G and the rapid takeover of coronavirus were identically timed, allowing them to link the two events together (Lynas, 2020). To learn more about the image behind this meme, visit https://knowyourmeme.com/memes/i-bet-hes-thinking-about-other-women.

Figure 23. Meme number three. Adapted from Lynas (2020).

Meme number three was inspired by the conspiracy theory that big pharmaceutical companies are hyping up COVID-19 to appear worse than it is in order to sell more products (Lynas, 2020). For example, Joseph Mercola, an anti-vax medical professional, was banned from Google for pushing his products through claims that they cure and prevent COVID-19 (Lynas, 2020). According to Lynas at Cornell Alliance for Science, "big pharma conspiracies are a staple of anti-vaccination narratives, so it is hardly surprising that they have transmuted into the age of coronavirus" (2020, sec. "COVID is a plot by Big Pharma). To learn more about the image behind this meme, visit https://knowyourmeme.com/memes/disaster-girl.

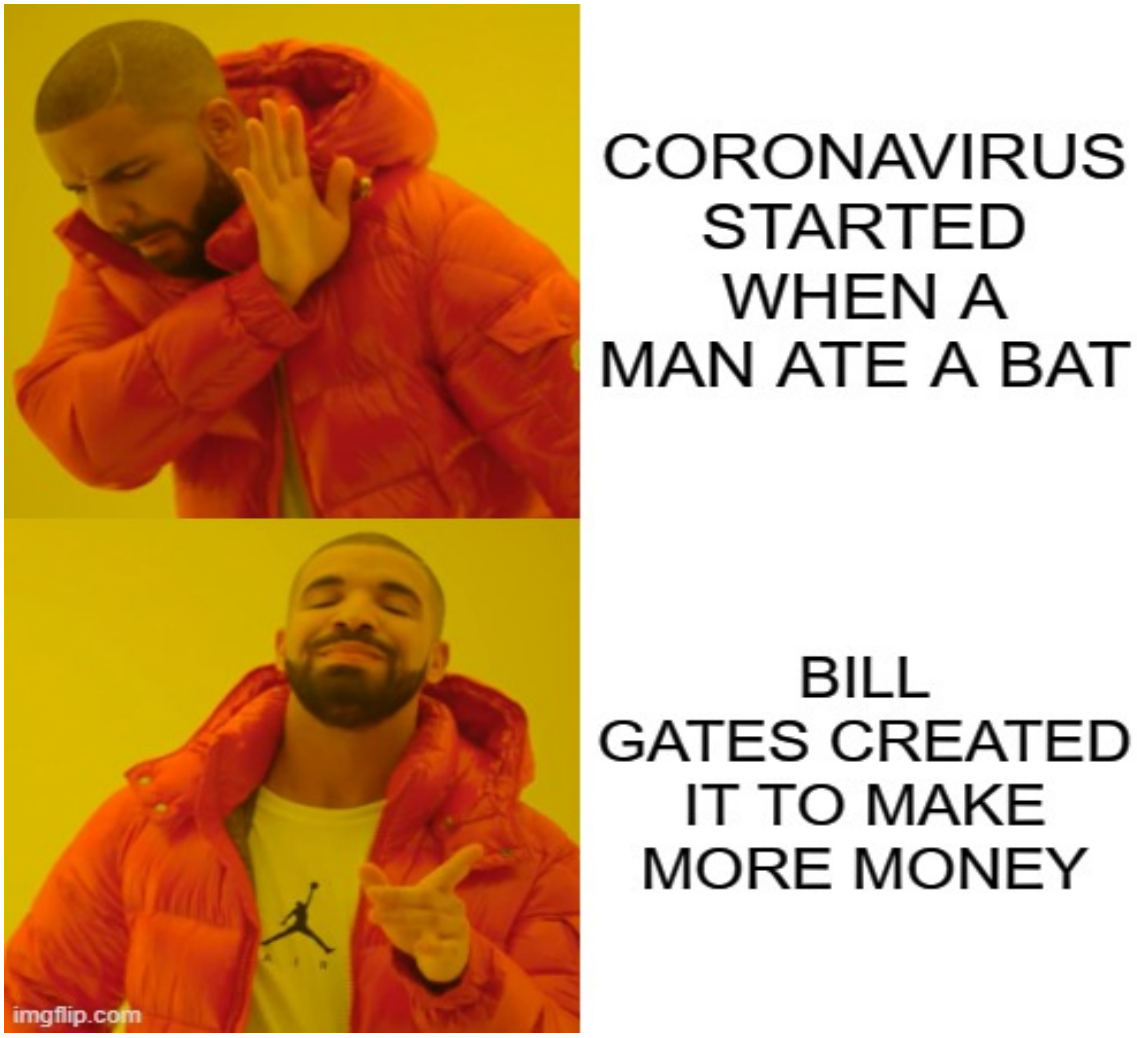

Figure 24. Meme number four. Adapted from Lynas (2020).

Meme number four was inspired by the theory that Bill Gates knew about an impending pandemic and, either created the virus, or invested in vaccination technology to profit off of it (Lynas, 2020). According to QAnon and far-right political members, previous Bill Gates Ted talks allude to his knowledge of an impending global pandemic (Lynas, 2020). Some protestors to this conspiracy theory believe it is the result of Gates criticizing former President Trumps move to defund the World Health Organization (Lynas, 2020). To learn more about the image behind this meme, visit https://knowyourmeme.com/memes/drakeposting.

Figure 25. Meme number five. Adapted from Lewis (2020).

Meme number five was inspired by a conspiracy theory that believes COVID-19 was released from a Chinese lab as a bioweapon (Lewis, 2020). Although the true origin is said to be naturally occurring in Wuhan, China, former President Trump and many supporters claim it started in Chinese virologist Shi Zhengli's lab (Lewis, 2020). To learn more about the image behind this meme, visit https://knowyourmeme.com/memes/distracted-boyfriend.

Figure 26. Meme number six. Adapted from Pinsker (2021), Beals (2020), Bazelon (2020), & Clarke (2020).

Meme number six was inspired by the continued question that has plagued American minds since March 2020: When will life be normal again? (Pinsker, 2021). Initially, citizens were told that COVID-19 would likely diminish in the summer of 2020 (Beals, 2020). Following the realization that that was not the case, Americans in many states were in disarray over the continuous closure of the economy, wondering when that would reopen (Bazelon, 2020). As much of the world transitioned to 2021 still in state-wide lockdowns, hopeful citizens pushed their winter travel to 2021 (Clarke, 2020). The final section of the meme, stating "the government is handling this well," is simply a way to make it appear controversial. To learn more about the image behind this meme, visit https://knowyourmeme.com/memes/putting-on-clown-makeup.

Figure 27. Meme number seven. Adapted from Lee (2020), & Naishadham et al. (2020).

Meme number seven was inspired by the idea that selfishness has led to many infections and untimely COVID-19 related deaths. Currently, there are a number of opinion pieces found online that link selfishness to the deaths of loved ones. For example, on *The Colorado Sun* website, you can find an article entitled, "Selfishness during a pandemic may have killed my father. It shouldn't have ended this way" (Lee, 2020). Additionally, on the *Chicago Tribune* website, you will see an article titled, "Too many people are selfish: As

Americans resist COVID-19 restrictions, U.S. nears 5 million infections" (Naishadham et al., 2020). To learn more about the image behind this meme, visit https://knowyourmeme.com/memes/daily-struggle.

Figure 28. Meme number eight. Adapted from Pitofsky (2021).

Meme number eight was inspired by the large number of the U.S. population that claims they will not get the COVID-19 vaccine due to safety concerns (Pitofsky, 2021). According to an article on *The Hill*, 30% of Americans surveyed said they would not get the COVID-19 vaccine (Pitofsky, 2021). Of that 30%, 48% claimed they were waiting to review long-term effects and safety numbers (Pitofsky, 2021). Another survey conducted by the Center for Disease Control and Prevention states that 24% of Americans will not get the vaccine, 50% of said 24% were also waiting to see if it was safe (File & Mohanty, 2021). This meme perpetuates the idea that the vaccine is not, in fact, safe, and the U.S.

government is giving it out anyway. To learn more about the image behind this meme, visit https://knowyourmeme.com/memes/who-killed-hannibal,

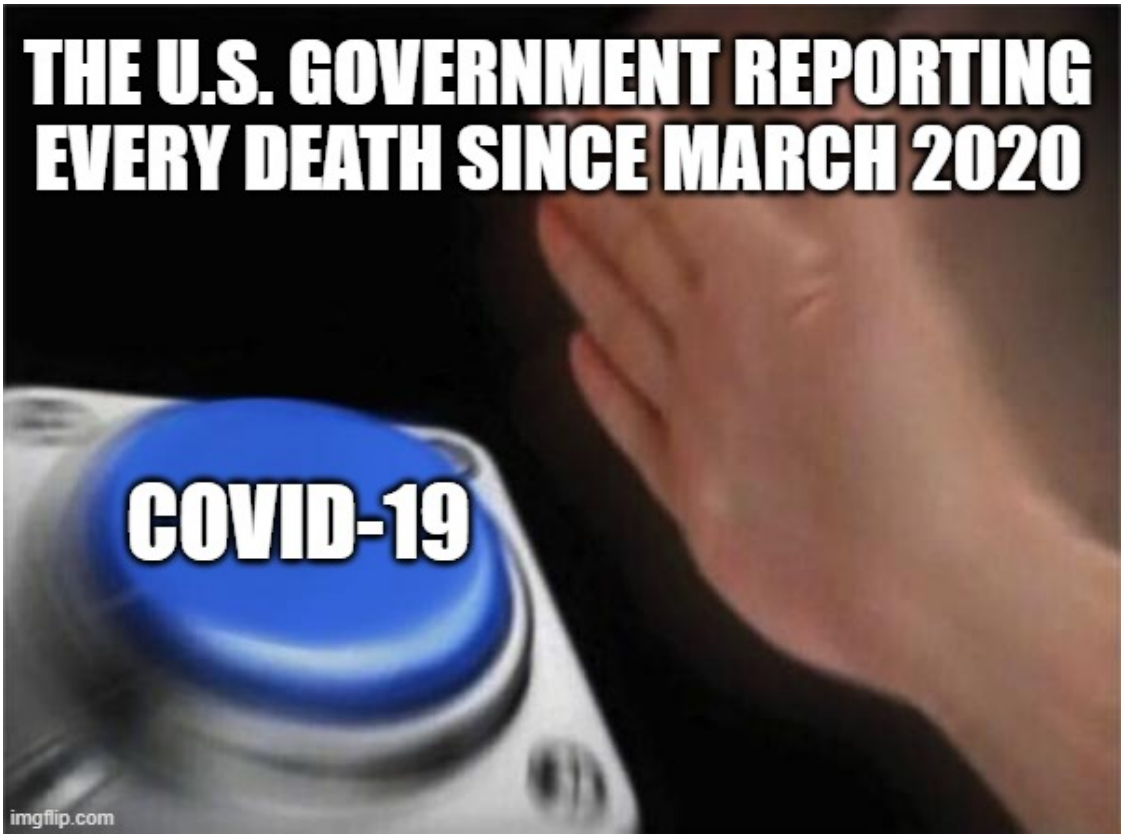

Figure 29. Meme number nine. Adapted from Lynas (2020).

Meme number nine was inspired by the conspiracy theory that death certificates are being manipulated to make all deaths a result of COVID-19 (Lynas, 2020). This conspiracy theory was perpetuated by Annie Bukacek, who spoke in a YouTube video describing the death certificate manipulation (Lynas, 2020). After amassing over 250,000 views, the doctor was exposed as a far-right, anti-vax activist likely speaking with an agenda (Lynas, 2020). Despite that knowledge, many people continue to spread this message. To learn more about the image behind this meme, visit https://knowyourmeme.com/memes/invest-button.

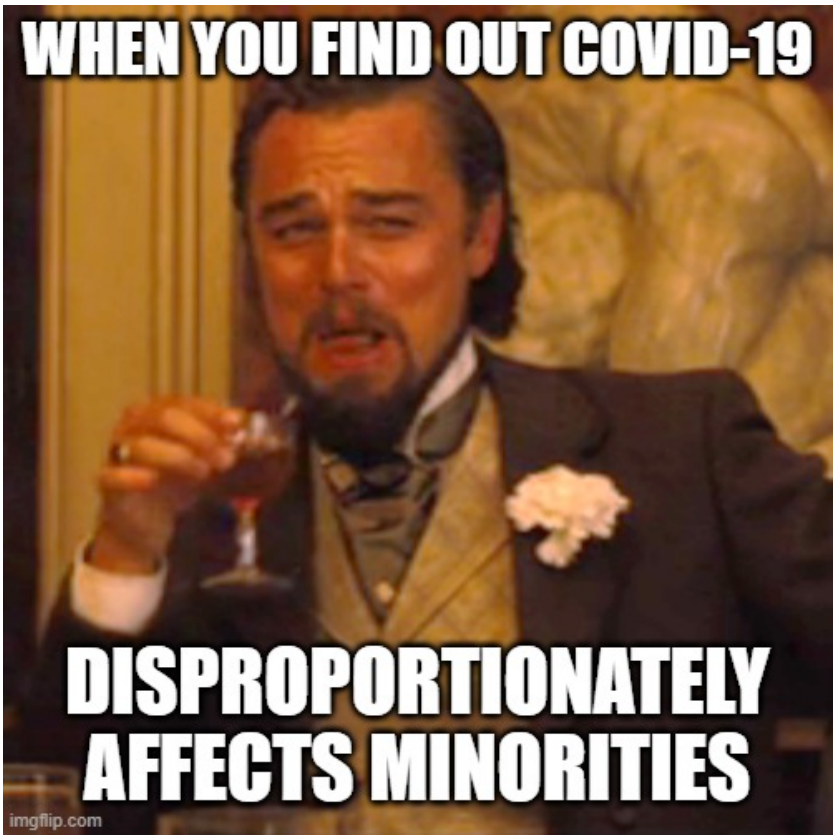

Figure 30. Meme number ten. Adapted from CDC (2021).

Meme number ten was inspired by the growing evidence that COVID-19 disproportionately affects minorities (CDC, 2021). By placing this specific image in the background, it appeals to a white nationalist audience, spreading the false idea that white people are superior to minorities. To learn more about the image behind this meme, visit https://knowyourmeme.com/memes/leonardo-dicaprio-laughing.

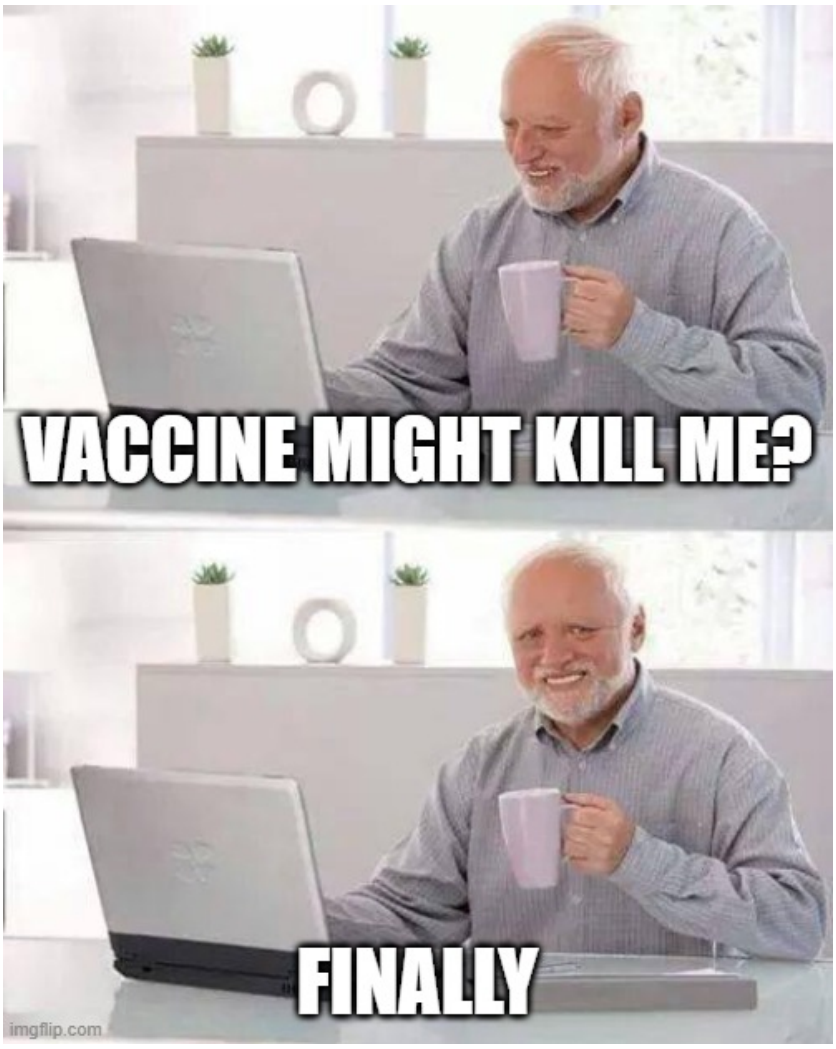

Figure 31. Meme number eleven. Adapted from Pitofsky (2020).

Meme number eleven was inspired by the same statistics presented earlier for meme eight. To learn more about the image behind this meme, visit https://knowyourmeme.com/memes/hide-the-pain-harold.

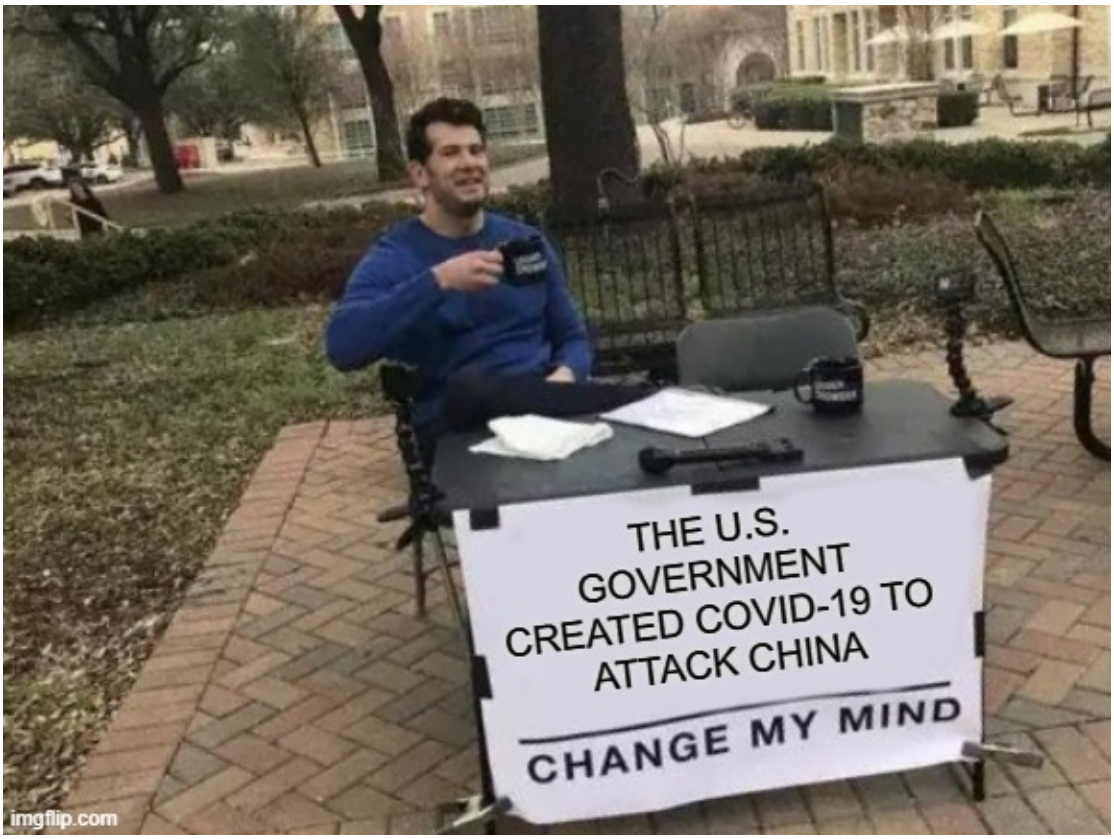

Figure 32. Meme number twelve. Adapted from Klepper et al. (2021).

Meme number twelve was influenced by the conspiracy theory that "the U.S. created the virus and used it to attack China" (Klepper et al., 2021, sec. "Igor Nikulin"). A prominent Russian political Figure, Igor Nikulin, who has supported weaponizing misinformation, appeared on Russian state television to spread this narrative 18 times between the months of January 2020 and April 2020 (Klepper et. al., 2021). To learn more about the image behind this meme, visit https://knowyourmeme.com/memes/steven-crowders-change-my-mind-campus-sign.

Figure 33. Meme number thirteen. Adapted from Lynas (2020).

Meme number thirteen was inspired by the idea that COVID-19 isn't real. David Icke and Alex Jones, both of which are professional conspiracy theorist, spread the narrative that COVID-19 was created as "a plot by the globalist elite to take away our freedoms" (Lynas, 2020, sec. "COVID-19 doesn't actually exist"). To learn more about the image behind this meme, visit https://www.dictionary.com/e/memes/expanding-brain-meme/.

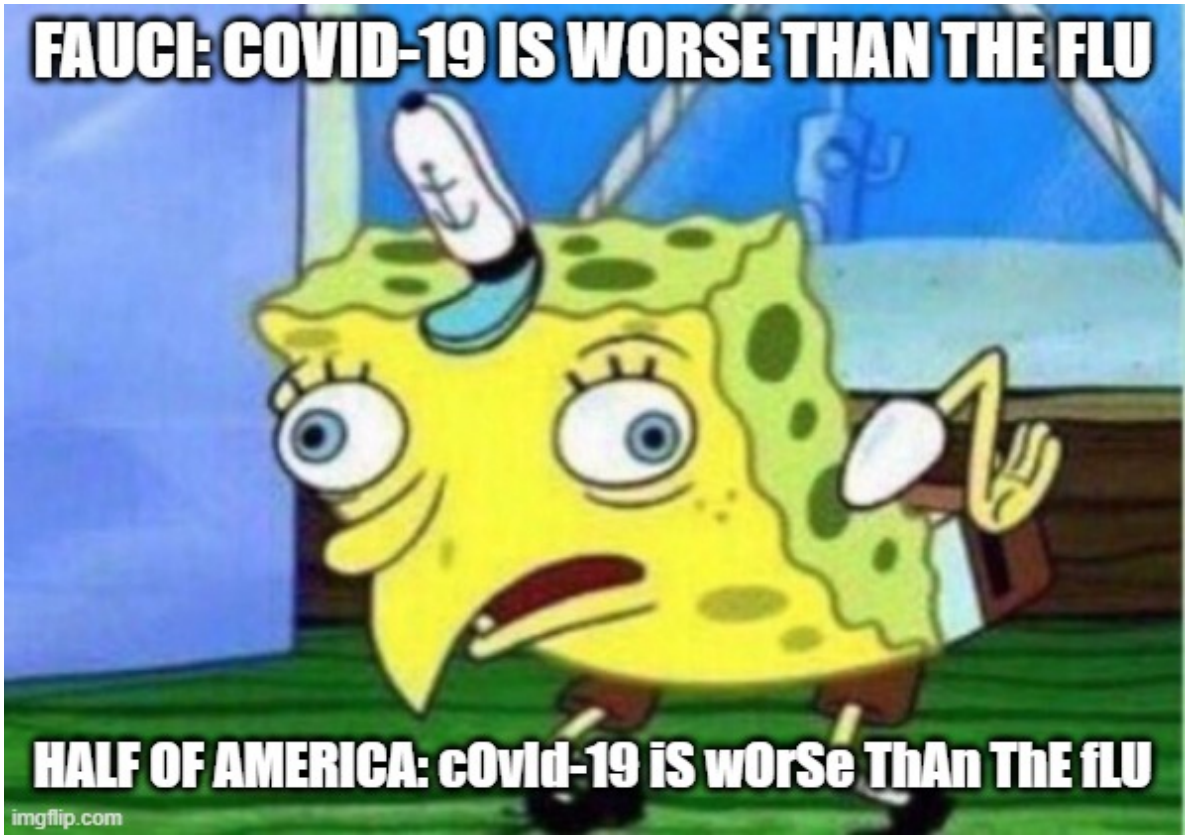

Figure 34. Meme number fourteen. Adapted from Lewis (2020).

Meme fourteen was created as a response to former President Trump's claims that the coronavirus was "no more dangerous than the seasonal influenza" (Lewis, 2020, para. 4). Many U.S. citizens went on to believe this claim because their leader was explicitly stating it (Lewis, 2020). To learn more about the image behind this meme, visit https://knowyourmeme.com/memes/mocking-spongebob.

D. QUALTRICS

To build this experiment, Qualtrics was utilized. Qualtrics is an online platform that allows users to build very complex surveys for use in data collection for businesses, research, and other organizations (Qualtrics, 2021). To build this specific experiment, a "Brand Administrator" type of account was purchased and used. After creating an account, "Create New Project" was selected and the experimental design began.

1. Steps to Create the Experiment Designed in this Thesis

1. Use the default question block to create the introduction and instructions notification. This can be done by clicking on the Q1 and keeping the question type as “Multiple Choice,” ensuring the answer type is set to “Allow one answer,” and the number of choices is set to “2.” After filling in the text and answer choices, the question behavior “Skip Logic” was added. If an individual selects “I do not wish to participate in this experiment” then he/she will be taken directly to the default end page. Figure 35 will show what text is present in the experiment designed in this thesis.

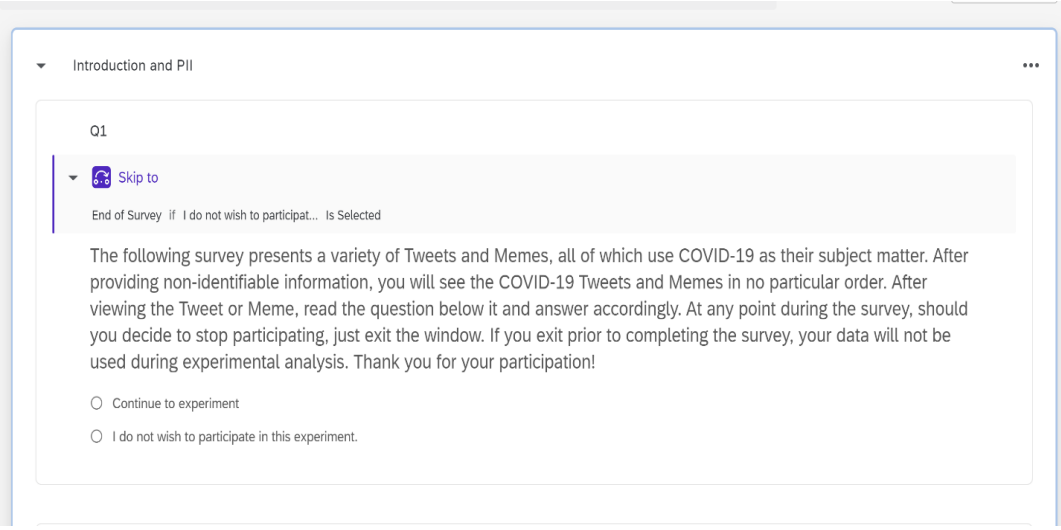

Figure 35. Question one example

2. Click the plus sign within the first question block to add another question. This question will be set up exactly like the previous question but contain consent information, which can be reviewed in Figure 36. In this case, the “skip logic” is tied to “I do not consent to participate in this experiment.”

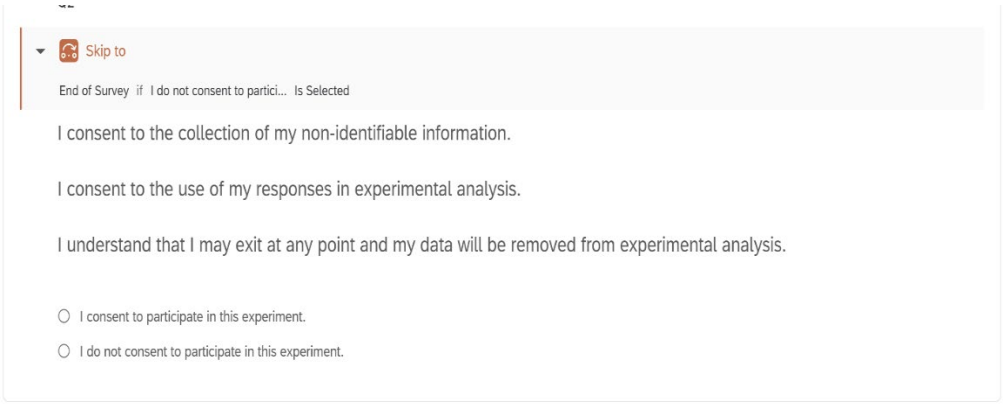

Figure 36. Question two example

3. Click the plus sign within the first question block to add another question. This question is set up like the previous two. However, it asks the participants to provide their age group, requiring seven answer choices vice two. After inputting the age groups listed in Section B of this chapter, options for "Under 18" and "58 or older" are included. Because we are not measuring individuals below/above this age range, those answer choices contain "skip logic" that takes the participant to the end of the survey.

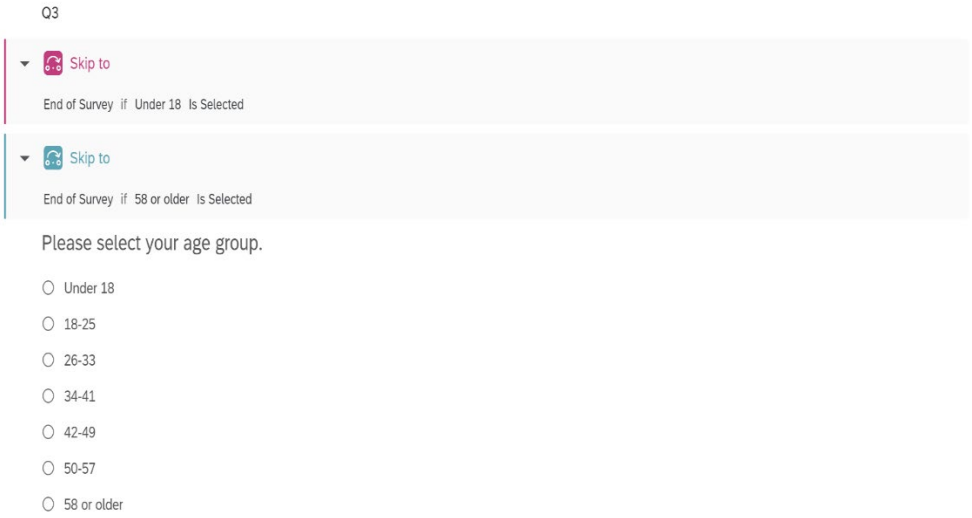

Figure 37. Question three example

4. Click the plus sign within the first question block to add another question. This question is set up like the previous three. However, it asks the participants to provide their gender, requiring three answer choices. In this case, the “skip logic” is tied to “None of the Above” because one goal of the experiment is to correlate survey answers to gender. If they do not fall into a category, we cannot correlate them properly.

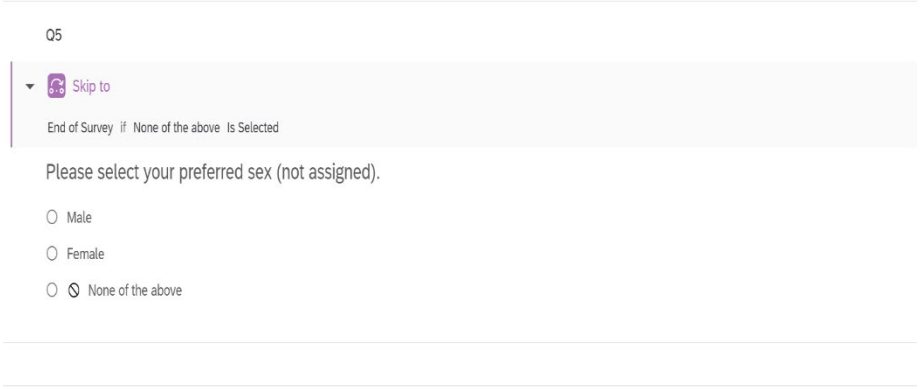

Figure 38. Question four example

5. Step 5: Click the plus sign within the first question block to add another question. This question is set up like the previous four. However, it asks the participants to provide their education level, requiring nine answer choices. In this case, the “skip logic” is tied to “None of the Above” because one goal of the experiment is to correlate survey answers to education level. If they do not fall into a category, we cannot correlate them properly.

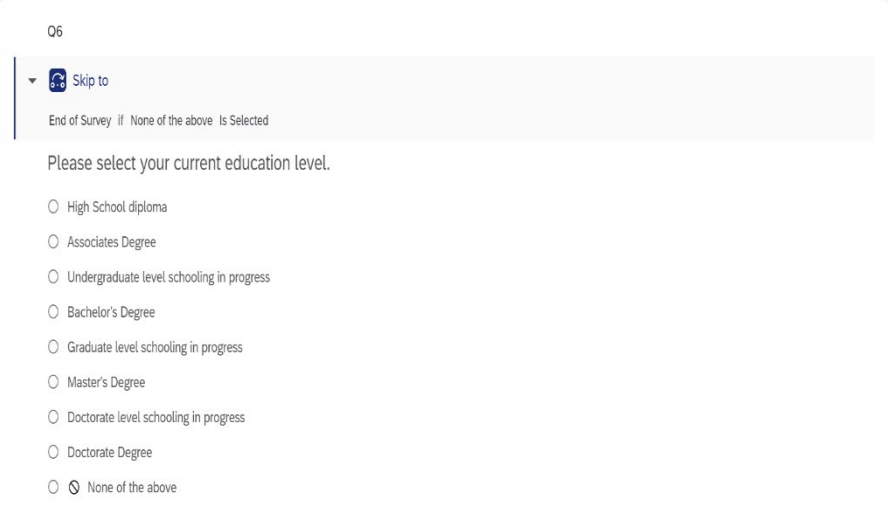

Figure 39. Question five example

6. Create a new block by selecting "Add Block." This block will be labeled "No Initial Categorization (Meme 1)." Open the block add a new "Text/Graphic" question. Then, change the content type to graphic. Without adding a graphic, add a new multiple-choice question to this block. Because this block is labeled as "No Initial Categorization," we will input question set two from Section B of this chapter, which contains eight answer choices. The block created will look like Figure 40.

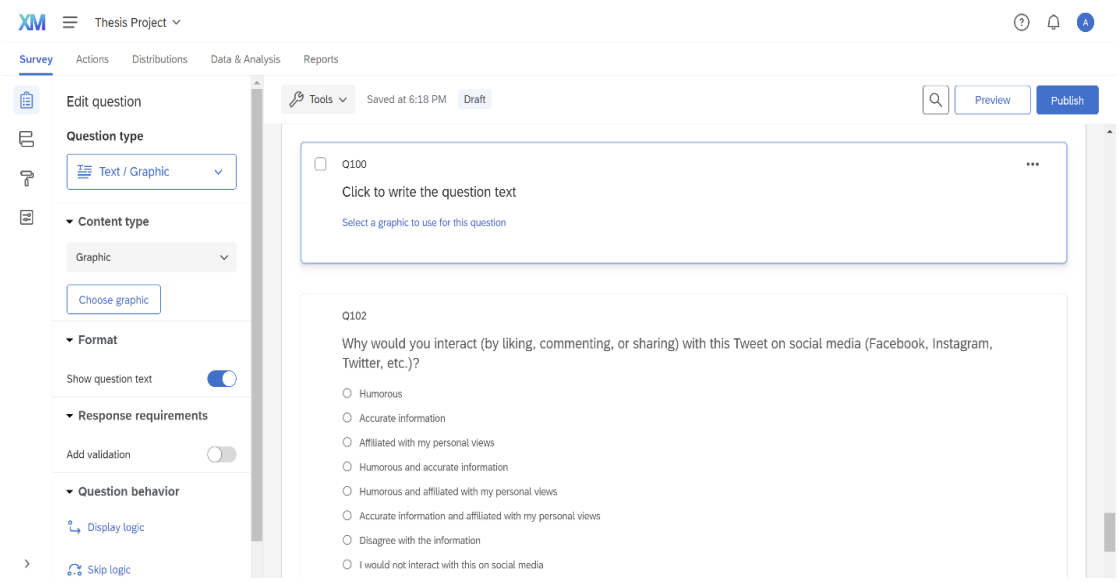

Figure 40. No initial categorization block example

7. After completing the above block, click the three dots to the right of the block title. Click "copy" and insert "No Initial Categorization (Meme 2)" into the "Please type a brief name/description of the new block:" box. After copying the block once, continue until you have created enough blocks for seven no initial categorization memes and seven no initial categorization Tweets.

8. Step 8: Create a new block and label it "Initial Categorization (Meme 1)." Add a "Text/Graphic" question to the block and change the content type to graphic. Without adding a graphic, add three new multiple-choice questions to this block. Because this block is labeled as "Initial Categorization," we will input question set one from Section B of this chapter, which contains three questions, one with two answers and two with seven answer choices. On the "IF YES" and "IF NO" questions, add the question behavior "Display Logic." Click "Question," then select the yes/no multiple-choice question in the block you are working in, and select answer choice yes/no depending on the associated question. The block created will look like Figure 41 below.

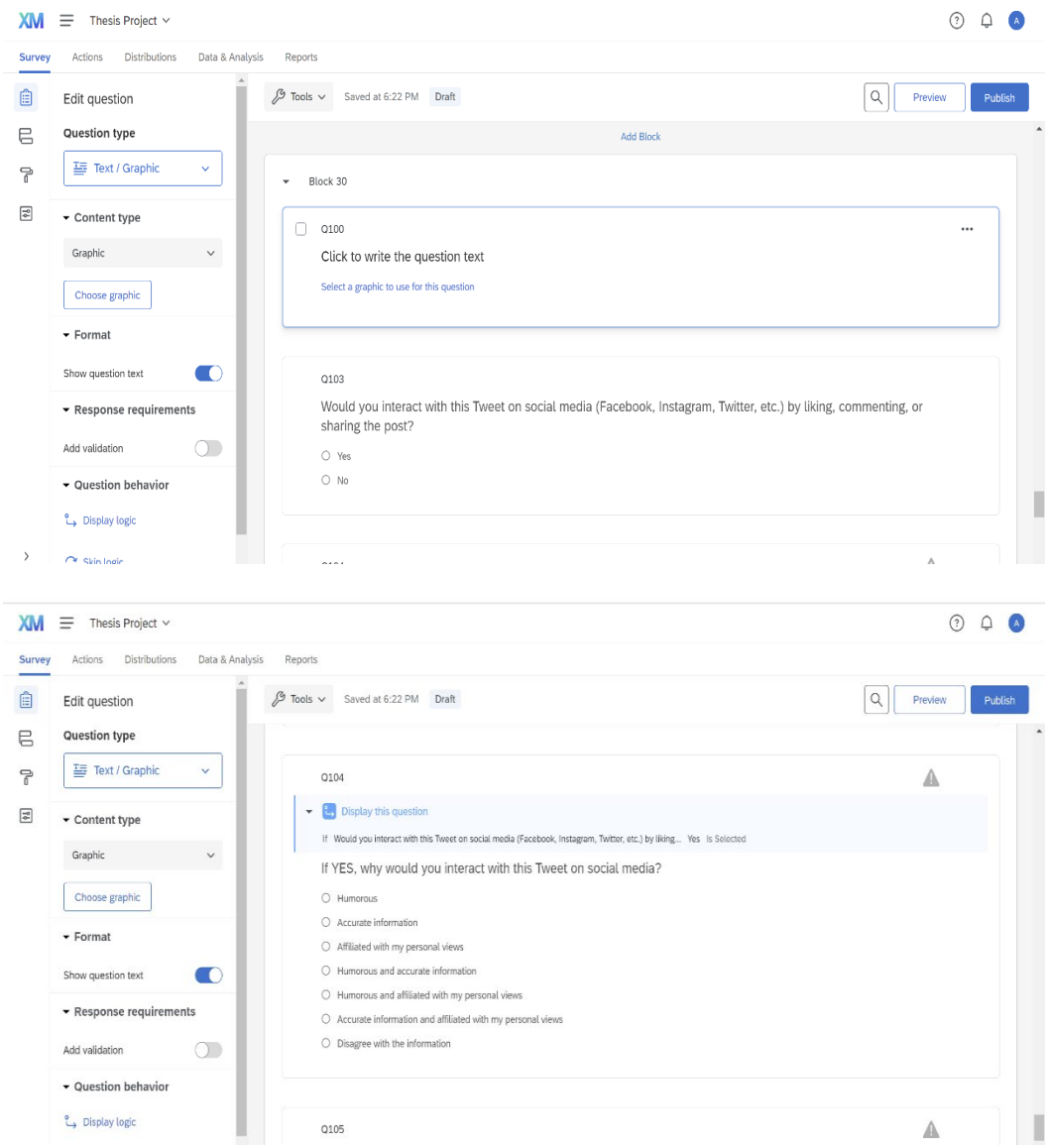

Figure 41. Initial categorization block example

9. After completing the above block, click the three dots to the right of the block title. Click “copy” and insert “Initial Categorization (Meme 2)” into the “Please type a brief name/description of the new block:” box. After copying the block once, continue until you have created enough blocks for seven initial categorization memes and seven initial categorization Tweets.

10. At the top of the webpage, click the three lines next to the Qualtrics logo. After clicking, select the “Library” from the drop down. Click on “Graphic Library” right below the logo and three lines.

11. Click “New Folder” and title it “No Initial Categorization Memes.” Then, hit “Upload Graphic” and upload the seven images that will be used for the “No Initial Categorization Memes.” After they are uploaded, click the gray box under the first image and label it “NIC M1,” which stands for “No Initial Categorization Meme 1.” Label the remaining six images, ensuring to change the number after each “M.”

12. Repeat step 11 until folders for “No Initial Categorization Tweets,” “Initial Categorization Memes,” and “Initial Categorization Tweets” are complete. Ensure that the picture labeling is altered in each new folder, accurately depicting what graphic folder and graphic number it is assigned.

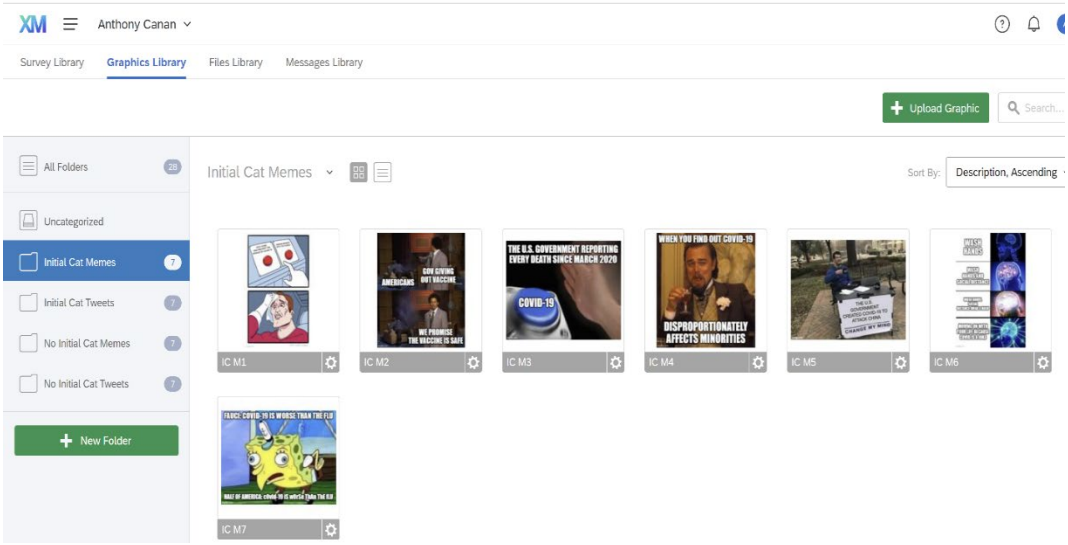

Figure 42. Complete Qualtrics image library

13. Return to your project. On the block titled “No Initial Categorization (Meme 1),” click on the empty “Text/Graphic” question. Click “Choose

graphic." Match the block title to the graphic label. For example, click the image labeled "NIC M1" and it will automatically appear in the question.

14. Move to the next empty block and repeat step 13, ensuring that the block title and the graphic title match. Continue until all 28 blocks have graphics inserted.

15. Add a final block with a "Text Entry" question. This question alerts the participant that the survey is over and that all information they were presented with was false. It also requires that they acknowledge that they viewed misinformation and are complete with the survey. See Figure 43 for an example.

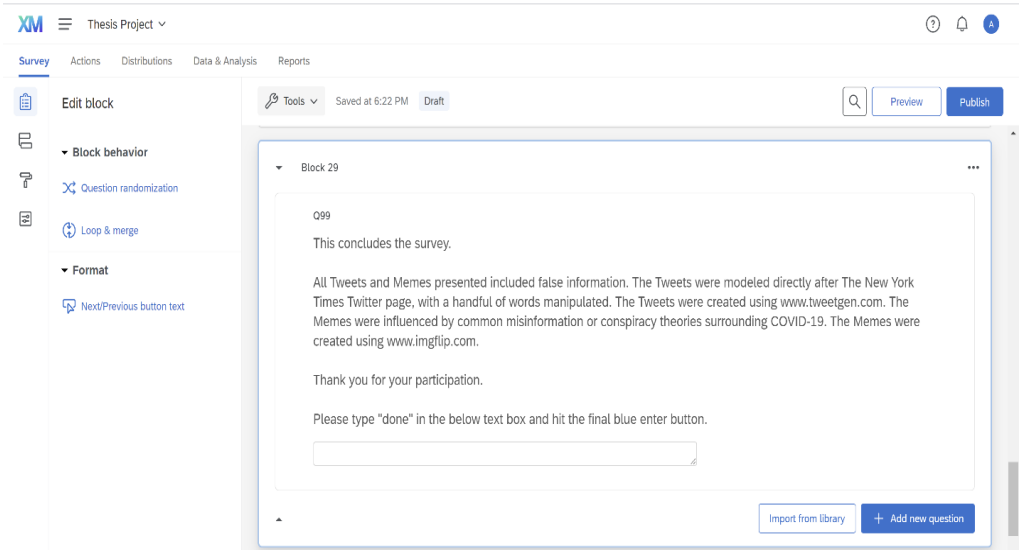

Figure 43. End of survey acknowledgement

16. Click on the "Survey Flow" icon on the left side of the screen. Currently, all the blocks will be left justified in a single line. In order to get the survey to flow like the diagram in Section B, adjustments need to be made. Click "Add a New Element Here" and select "Randomizer." On the new element, click "Evenly Present Elements." Under your new element, click "Add a New Element Here" and select "Randomizer" again. Again,

click “Evenly Present Elements” on the newest “Randomizer.” Finally, under your newest element, hit “Add a New Element Here” and select “Randomizer” for a third time. Under the third “Randomizer,” click “Add a New Element Here” and select “Block.” Add all seven blocks for “No Initial Categorization (Meme X)” here. See Figure 44 for an example.

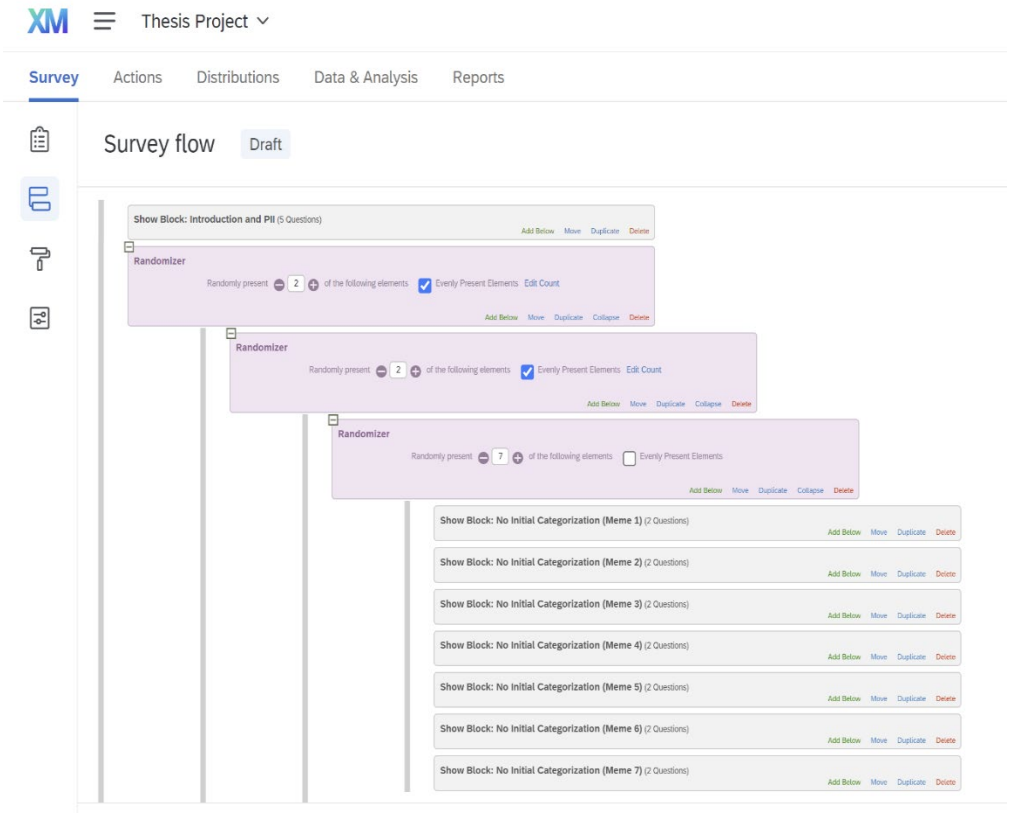

Figure 44. First set of the survey flow

17. Under your second “Randomizer,” not the most right justified, click “Add a New Element Here,” and select another “Randomizer.” Under the new “Randomizer,” add all seven of the “Initial Categorization (Meme X)” blocks. See Figure 45 for an example.

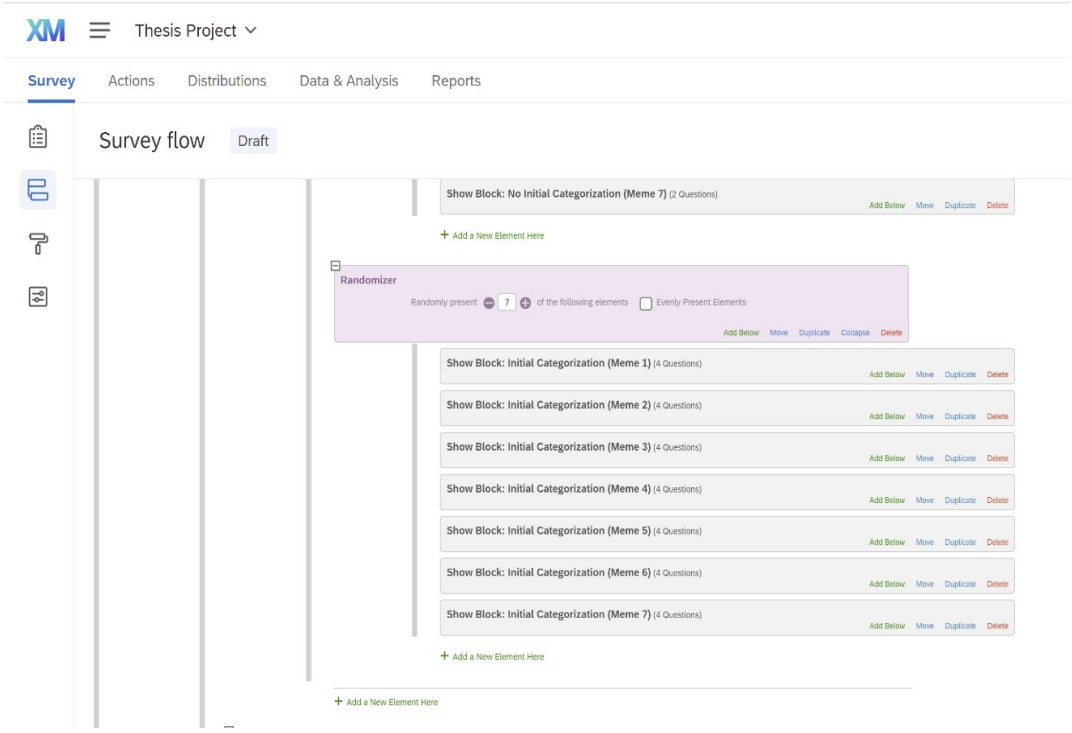

Figure 45. Second set of the survey flow

18. Under the left most justified “Randomizer,” select “Add a New Element.” Click “Evenly Present Elements.”

19. Add an additional “Randomizer” onto the newest “Randomizer” created in step 17. Under the newest randomizer, add all seven of the “No Initial Categorization (Tweet X)” blocks. Repeat this step by adding another “Randomizer” and all seven of the “Initial Categorization (Tweet X)” blocks.

20. On the left most justified line, add a final new element as a “Block” and select “Show Block: End of Survey Acknowledgement.”

21. In the top right corner, select the “Preview” button and ensure the survey is working as intended. The first page will look like Figure 46.

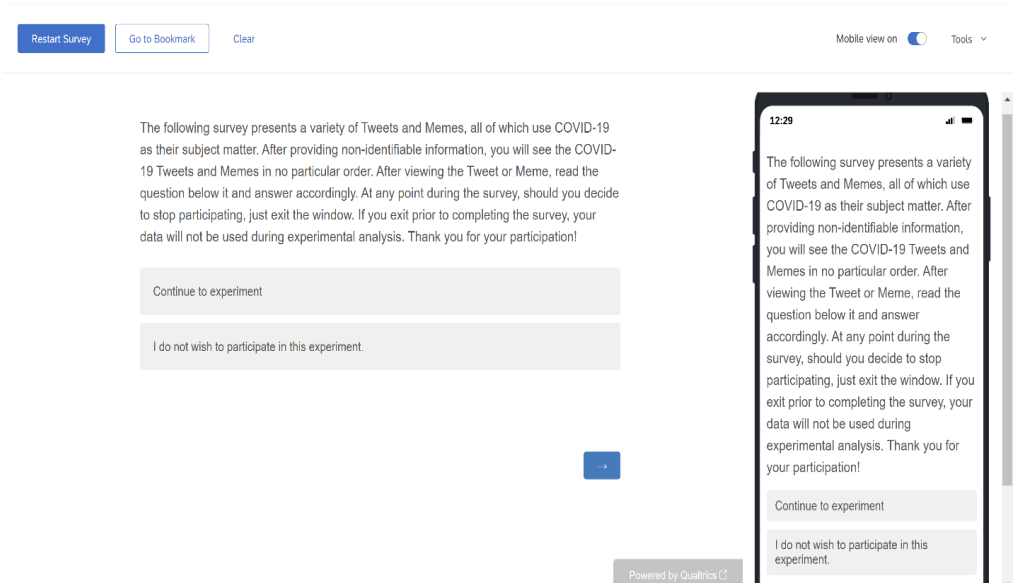

Figure 46. Preview of the survey

2. Testing the Survey

Once the Qualtrics building portion was complete, the survey was tested by four individuals, verifying that it works as intended. No results were recorded.

E. LIMITATIONS

The greatest limitation to this experimental design is the use of one type of meme. As mentioned previously, memes encompass a wide array of digital objects. This experiment, however, is only designed to draw correlations with image macro memes. Additionally, this experiment uses Tweets that only include text blurbs. On Twitter, users can imbed images and links, which may affect the way users interact with the digital objects. Finally, the experiment is designed to be run online using Mechanical Turk or a similar experiment platform. While these platforms are used to run many experiments, individuals of certain socio-economic statuses may not have means to access and perform the experiment, possibly removing a large audience from survey results.

V. FUTURE WORK, IMPLICATIONS, CONCLUSION

A. FUTURE WORK

First and foremost, it is recommended that this experiment be run to its fullest capacity. Once conducted, it is recommended that researchers adjust the type of meme to test for correlations between type and the selected independent variables. Additionally, it is recommended that the Tweets be imbedded with images or links to see if that affects participant interaction rate. Finally, it is recommended that the experiment be conducted world-wide to determine if various nations respond differently to the use of Tweets and memes to spread false information.

B. IMPLICATIONS

Throughout this thesis, it has been made apparent that memes are wide-scale information dissemination tools that are poorly understood by much of academia. Despite that, memes are being utilized to spread false narratives on a global scale. While research suggests that memes reach depths greater than traditional images, and misinformation gets shared at far greater rates than true information, there is extremely limited text detailing who is responsible for this phenomenon. The experiment designed in this thesis will add to a new body of work that attempts to determine who is influenced by and propagates the majority of Tweet and meme information disorder. After conducting the experiment and drawing correlations, the relationships identified can be acted upon on both a defensive and offensive level by a multitude of entities.

If it is noted that certain genders, age groups, or education levels interact with and believe false information at greater rates than others, individuals and organizations, like the military, will be able to create and conduct targeted information disorder training. As a defensive tactic, said organizations can protect their at-risk members from falling victim to and propagating memes that involve information disorder. Whether it be political, extremist, social-activist, or marketing based, the results of this experiment, when properly acted upon, can help curb the belief and spread of dangerous narratives related to those topics.

This experiment has extreme potential in the offensive realm. As noted throughout this thesis, other countries have begun using meme information disorder on American citizens. However, it is unlikely that they know who is most influenced by the narratives that they spread. The military would be able to infiltrate adversary social media platforms (which are different than the popular ones in the United States) and imbed information disorder that spreads a western narrative. Additionally, marketing firms can utilize the same tactics to reach greater levels of exposure, likely boosting sales. Conducting the experiment detailed in the previous chapter has the ability to show a more effective route to meme influence when targeting a hostile audience and provide a method for identifying potential vulnerabilities to nefarious actors' attempts to target domestic audiences.

C. CONCLUSION

The use of social media has been growing every year since inception. With that, individuals, organizations, businesses, and nations have created clever ways to spread messages to large audiences. However, in the last decade, those same entities have begun utilizing social media to spread false narratives that fit their agenda. Using Tweets and memes, non-state and state actors have successfully influenced elections, incited riots, and increased membership. Current academic research does not describe who is most susceptible to this new type of information disorder. For that reason, the experiment detailed in this thesis was designed. When conducted, it will reveal correlations between the acceptance and propagation of false information spread through Tweets and memes and the age group, gender, and education level of those most likely to interact with the false information. Once complete, defensive and offensive measures can be put in place by individuals, organizations, businesses, and nations to defend or attack the most at-risk groups.

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